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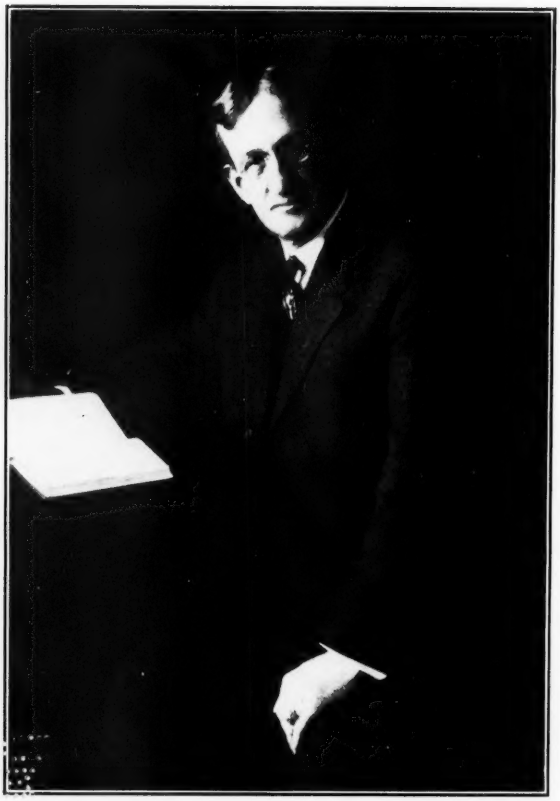

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Chairman Committee on Organization of Panama-Pacific Dental Congress.

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National Dental Association

VOL. 2 AUGUST, 1915 No. 3

POSSIBILITY OF THE ELIMINATION OF PAIN FROM DENTAL OPERATIONS.—A SYMPOSIUM.

By W. H. DeFord, A. M., D. D. S., M. D.; J. P. Henahan, D. D. S.; Kurt H. Thoma, D. D. S.; W. T. Jackman, D. D. S.

GENERAL ANESTHESIA AND ANALGESIA BY SOMNOFORM.

By W. H. DeFord, A. M., D. D. S., M. D., DesMoines, Iowa.

(Read before the National Dental Association, at its Eighteenth Annual Meeting, Rochester, N. Y., July 9, 1914.

"THE connection of mind and body is such that a given state of mind tends to echo itself at once in the body." 1.

"If a psychosis or mental state is produced by a neurosis or a material nerve state, as pain by a prick, so also is a neurosis produced by a psychosis. That mental antecedents call forth physical consequents is just as certain as that physical antecedents call forth mental consequents." 2.

"Mind, thru sensory, motor, vasomotor and trophic nerves, causes changes in sensation, muscular contraction, nutrition and secretion." 3.

"If the brain is an outgrowth from a body corpuscle and is in immediate relation with the structures and tissues that preceded it, then tho these continue to have their own action, the brain must be expected to act upon the muscular tissue (whether striped or unstriped), the organic functions and upon the nervous system itself." 4.

Just as the iniquities of parents are visited upon children of the third and fourth generations, patients who apply for dental operations, have accumulated, have inherited the sum total of fear and dread that have been transmitted thru three or four generations.

An approaching major surgical operation for some member of a given family, does not begin to affright the other members of the family to the same extent

that a series of dental operations covering a period of two or three months. In the case of a surgical operation, the patient at the appointed time goes to the hospital, an anesthetic is administered, and the patient remains in the hospital till all pain and inconvenience is over. The members of the family hear little or nothing of the patient during convalescence. The member of the family who is visiting the dentist three or four times a week for a period of two or three months, brings home with him after each sitting a description of the suffering and distress incident to the work performed, magnifying it, and complaining, at every meal of teeth too sore for mastication, pain from food that is cold and food that is hot, bites accidentally on the stopping covering and arsenical application, leaves the table in distress —all of which psychologically effects every other member of the family, each one of who knows full well that he must sooner or later visit a dentist, and to a greater or less extent, undergo the same. In the case of the surgical operation, he understands that he may never be called upon to undergo such an operation, but each member of the family understands full well that there is no escaping the dentist.

Thus it is that thru inheritance and environment, the connection of mind and body is such that a given state of mind tends to echo itself at once in the body, and years of such accumulating influence, have demonstrated that "mental antecedents call forth physical consequents, just as certain as that physical antecedents call forth mental consequents."

"A lady saw a heavy dish fall on her child's hand, cutting off three fingers. She felt pain in her hand, and on examination, the corresponding three fingers were swollen and inflamed. In twenty-four hours incisions were made and pus evacuated." 5.

"A hypnotized subject can hold out his arm indefinitely in painless contraction, can inhale strong ammonia under the name of otto of roses with unwatered eyes." 6.

"There seems no reasonable grounds for doubting that, in certain chosen subjects, conjestions, burns, blisters, raised papules, bleeding from the nose or skin can be produced by suggestion." 7

"The affects of a purgative pill has been rendered nil and it has produced sleep in the belief that it was an opiate pill, tho consisting of a strong dose of colocinth and calomel. On the other hand, an opium pill given for sleep has failed to produce it, but proved a strong purgative in the belief it was so intended." 8.

Unfortunately a state of mind has been induced in our patients thru inheritance and from constant complaint on the part of friends and companions that dental work to be performed entails discomfort, physical hardship and suffering, consequently, these mental conditions must be dispelled or the least painful operation we are called upon to perform will be interpreted as unbearable.

"The only exception is a child who has not experienced any previous dental operations, or has not experienced pain from toothache, or been subject to the complaints of others, or to whom the parent has not held up the dentist as a bogy man. Such a patient I have no trouble to work for—never deceiving them, letting them know they will feel this and that when you know feeling will result from the part of the cavity you are working in. They, not being scared, will receive no greater pain sensation than from the same amount of feeling in any other part of the body." 9.

The brain receives impressions thru the five senses; hearing, sight, smell, taste, and touch. We have already made reference to the mental impressions resulting from hearing, but in addition to this, "we can hear thru the teeth about as well as thru the ears.

It is the noise from the jump of the bur in the cavity or the click of the bur upon the enamel that automatically records a false impression of pain. We have all had the experience of operating on a devitalized tooth and the patient experiencing all the pain sensations that would come from a vital tooth." 10. This is an example of the false registration of pain thru the sense of hearing.

Sight has a potent influence in suggesting pain. How often patients shudder, cringe and blanch from pain impressions excited upon seeing the dentist approach them with a hypodermic needle, nerve broach or a pair of forceps. I have known patients to faint when being approached by a dentist with only a mouth mirror and explorer for the purpose of an examination.

Smell plays its part in the false registration of pain sensations. The odor of carbolic acid and oil of cloves recalls its application on some previous occasion for pulpitis; the odor of ether and chloroform makes vivid the distress incident to recovery from some surgical operation. It is highly important that the odor of drugs be eliminated from our operating rooms.

False registration of pain thru touch is met with constantly when performing dental operations. Few, if any of our patients, are capable of distinguishing the difference between the sensation arising from the touch of instruments—pain sensations will be interpreted by the patient even when there is no pain, and in the analgesic stage, it must be imprest upon the mind of the patient that they can feel the pressure of the bur and hear the sound of the bur but there is no pain.

Recently I induced analgesia for the purpose of sensitive cavity preparation. I was certain that the patient could not feel pain in this deep stage of analgesia, but apparently she suffered as severely as without analgesia. A cavity in the left central incisor was being prepared. To convince the operator that the patient was experiencing a false registration of pain, I inverted his excavator and touched the tooth, not the cavity, touched the tooth with the handle, then went as far away as the right lateral, and I never saw a patient apparently suffering greater pain. The slightest touch was interpreted as pain in this case.

"For a certain patient, preparation of a cavity had become so painful the patient refused to have the operation completed. Analgesia was induced, patient remarked, 'I can feel the pain just the same but have no desire to dodge or pull away from the instrument.' Another patient with as painful a condition remarked, 'I can feel the pain just the same but do not care a d—m.' It is evident that neither of these patients felt the slightest pain, but they failed to properly interpret their sensations." 11.

The dental surgeon stands indicted by the general public as the most cruel, barbarious and inhuman of medical specialists. The opthalmologist, otologist, rhinologist, laryngologist, gynaecologist, oral surgeon and other specialists have adopted methods of pain aleviation thus doing better work and getting better results than formerly, but the rank and file of the dental profession are no more advanced than they were a quarter of a century ago, in the matter of making dental operations less painful.

"It seems almost beyond comprehension, when the means is at hand to prevent pain, and the public are clamoring for it, demanding it, we go on in the same old way, obtaining inferior results, knowing at the time that the operation falls short of what it should be, and will fail in a few months because we cannot remove the carious dentine thoroly or cannot prepare a cavity sufficiently well for the retention of a filling or inlay, and fail utterly in shaping a tooth for a crown, and are defeating in removing calcarious deposits, yet 90 per cent of dental surgeons continue this line of practise." 12.

The solution of this most difficult problem is simple and can be exprest in two words, ANALGESIA and ANESTHESIA.

Sir Frederick W. Hewitt's Table, showing the degrees or stages in the action of the chief general anesthetics upon the human organism, and the phenomena that usually characterize these stages, makes twelve subdivisions for the stage of analgesia. 13. Among them is "excessive ideation," "disturbance of judgment" and "dreams." At the time the patient is experiencing "excessive ideation" and "dreams," HELPFUL SUGGESTIONS ARE IN ORDER. "There is a period under an anesthetic at which many patients, indeed most patients, will see, feel and experience the very things suggested as surely as if they were real, and this period is just before consciousness is lost; just at that stage where painless cavity preparation can be made." 14.

"If suggestion is potent enough when a person is normal to lock up the bowels with a cathartic, liberate the bowels with opium, mistake strong ammonia for cologne, increase or decrease the heart's action, increase or lesson respiration, cause bleeding from the nose or check hemorrhage, surely by the aid of an anesthetic, placing the patient in that stage where they are susceptible to suggestion, the dental surgeon should not find it difficult to induce that frame of mind and condition of body where dental operations can be performed painlessly," or the pain incident to the operation as ordinarily performed can be held in abeyance to such an extent as to elicit no objection on the part of the patient.

"In rabbits subjected to the emotional stimulus of fear alone the brain cells showed precisely the same changes as those which resulted from physical injury, namely, an immediate stage of hyperchromatism and a later stage of chromotolysis; a disturbance of the nucleoplastic relation and the final disintegration of many cells. As the result of strong fear repeated daily for two weeks as many as 18 per cent of the Perkenje cells were actually destroyed, and many animals died. In these rabbits acute fear caused a rise in temperature of from one to three degrees." 15. Because of the disastrous results of fear upon the cells and tissues of the brain, crile renders patients insensible to worry and fear preliminary to anesthesia for surgical operations by drug medication, just as I advocate analgesia for the same purpose leading up to and during dental operations. Render patients insensible to the fear and dread incident to dental operations by analgesia, relieve them of worry and apprehension as they sit in the dental chair, and cell destruction dependent upon both traumatism and fear is intercepted.

Gas-Oxygen and Somnoform are almost ideal agents for inducing dental analgesia and anesthesia.

The analgesia movement is progressing rapidly. It is enthusiastically received by the people. Walt Mason, the Kansas philosopher, must have fallen into the hands of some merciful, kind hearted dental surgeon as he pays the following tribute to him:

The Dentist.

"He well deserves a laurel wreath, the man who tinkers with my teeth, when they are out of plumb; he plugs them up with melted lead, and soothes my swelled and aching head, and heals the tortured gum, Upon his skill your comfort hangs when you have trouble with your fangs, and seldom does he fail; his shining instrument he wags and draws the old insurgent snags, then draws his slice of kale. No more you hear in dentist's room the shrieks of those who dread their doom, of those whose souls are sick; the patient calmly sits and smiles, the while the dentist with his files and pincers does the trick. How different in olden days! The den-

tists then had painful ways; he sat upon a bench, and took your head between his knees, and, muttering, "Look pleasant, please," he plied his monkey wrench. It took six men to hold me down when he adjusted bridge or crown, or plugged a hollow fang, and travelers could hear me roar away upon the distant shore of Yang-tsze-kiang. But now I like the dentist's chair, I like to sit and rest me there, from morning until dusk, to sit in comfort and to snooze, and have the gentle dentist use his forceps on my tusk. WALT MASON."

1. Maudsley, **Physiology of Mind,** p. 302.

2. Carpenter, **Physiology of Mind,** p. 302.

3. Hack Tuke, **Mind and Body,** vol. 1, p. 2.

4. Ibid, p. 16.

5. Schofield, **The Unconscious Mind,** p. 257.

6. W. James, **Psychology,** vol. ii, p. 602,

7. Braid, **Power of Mind Over Body,** p. 6.

8. Schofield, **The Unconscious Mind,** p. 259.

9. W. T. Reeves, **The Use of Comprest Air for Desensitizing Sensitive Dentine,** Dental Review, Sept. 1913, p. 905.

10. DeFord, **Comfortable and Dependable Dental Operations,** Dental Summary, Nov. 1913, p. 845.

11. DeFord, **Analgesia in Dentistry,** Dental Review, Sept., 1913, p. 896.

12. Hewitt, **Anesthetics,** Third Edition, p. 84.

13. DeFord, **Lectures on General Anesthetics in Dentistry,** Second Edition, p. 267.

14. DeFord, **Comfortable and Dependable Dental Operations,** Dental Summary, Nov. 1913, p. 842.

15. Crile, Shock, **Journal of American Medical Association,** Dec. 6, 1913, p. 2027.

NITROUS OXID AND OXYGEN ANALGESIA IN OPERATIVE DENTISTRY.

By J. P. Henahan, D. D. S., Cleveland, Ohio.

I AM deeply mindful and appreciative of the honor which permits of my reading a paper to this famous body. I regret only the personal limitations which prevent a greater and more worthy effort.

Dentistry during the past years has developed and benefited by such a variety of improvements in ideas and methods of practise, that if a Rip Van Winkle were to awaken today and behold our profession, he would scarcely recognize in it the comparatively crude art of twenty years ago.

Not least among the improvements, is the realization of that for which the dental procession has labored so long and persistently, namely, the successful application of anesthesia in operative dentistry. Several methods have been developed, each possessing its peculiar virtues, and all long since past the experimental stage.

With the rapid advances which are be-

ing made in all other branches of our work, it is only reasonable to expect that this will keep stride, and in a few years, such a revolution will have taken place in dental practises, that some extraordinary condition alone will be excuse for a dentist inflicting pain upon a patient. His education and training will enable him to make a scientific selection of the best method for any given case, not relying upon any one method to suffice under all conditions.

The part has been allotted to me to present for consideration by this convention, the virtues of the agent which, in my opinion, holds the greatest possibilities for the greater number, laity as well as profession, considered. The agent which will reward the effort made to master its peculiarities, with the most nearly universal success, and the one which long usage has shown to be attended by no peculiarities which manifest themselves in dangerous after effects.

After reviewing statistics and clinical data, and also the results of several years actual experience in which Nitrous Oxid and Nitrous Oxide and Oxygen have been employed by me as an anesthetic and analgesic in general surgery, as well as in every variety of dental cases, I feel no hesitancy in recommending this agent to the members of the dental profession as a remedy for prevention wherever pain may be caused thru the performance of dental operations.

It is not my purpose to burden you with the presentation of a scientific treatise upon Nitrous Oxide and Oxygen, its chemical character or its physiological action, nor to present any new or so-called original method for its administration, but simply to remind my hearers of the possibilities, in the line of humanitarian dentistry, to be gained thru the medium of its employment.

Neither should it be necessary to make any comparison of Nitrous Oxid and Nitrous Oxid and Oxygen with the other well known anesthetic agents so commonly employed today. Hundreds of articles have been written, which deal with theories of the probable manner thru which anesthesia is produced, and also statistical records showing effects which manifest themselves days after the patient has apparently recovered from the anesthetic effects of the particular drug. In all these comparisons Nitrous Oxid and Oxygen has been conceded the position of being the most desirable general anesthetic in use.

These opinions all tend to show that when the dentist employs Nitrous Oxid and Oyxgen in a sensible manner, he is employing the anesthetic in which is embodied the least possible danger.

Altho anesthesia is a subject of the greatest importance to the dentist, and in itself necessary to him as the only method which makes possible the prevention of pain in many of his operations, still, as it is not the intention of this symposium to consider anesthesia but analgesia, we will pass at once to our subject.

Analgesia may be defined as that state in which the appreciation of pain is lost or materially lowered without the loss of the sense of touch or consciousness.

For the practise of analgesia a general plan of procedure should be adopted which, with necessary variations for individual cases, should be carried out with every patient.

The more simple the plan the greater its virtue. Under the plan the patient's mind should be put at perfect ease and no intimation of any burden of responsibility should be allowed to exist.

By this is meant that the patient should not be led to believe that upon him rests the responsibility of making known to the dentist the symptoms which characterize the development of analgesia. I have reason to believe that instructions along this line are often the cause of failure, due to bewilderment and doubt created in the minds of some,

which caused them to withhold confessions of conditions until too late, and the exciting stage of anesthesia has been reached.

I have outlined the following plan which, for purposes of explanation, may be divided into four parts.

1st. Preliminary instruction.

2nd. Suggestion.

3rd. Application of anesthetic.

4th. Performance of operation.

In practise each of these four divisions should be given its due consideration, if uniform success is to crown our efforts. Disregard will be rewarded usually with disappointment.

1st. The first part consists of information and preparation regarding diet. Usually aim to have the same condition as for anesthesia, a fasting condition for three hours, and in some cases nothing short of the most complete preparation regarding fast will permit of the continuation of analgesia for any length of time. Nausea and vomiting will result, and together with the resultant depression will terminate our efforts for the time being at least.

2nd Suggestion.

Under this heading we must consider our entire behavior toward the patient. In some exaggerated cases our every word and action must be carefully calculated to create the proper trend of ideas in the patient's mind.

Originality and discernment will be necessary to enable one to deal successfully with the various types which he will meet.

The bearing of the operator is of the first importance. He should be dignified and composed himself, if he hopes to instill the patient with confidence.

All our plans, including the explanation of the action and effect of the anesthetic, really are for the purpose of suggestion, to inspire the patient with confidence that no pain is to be experienced.

Many patients, especially those who have had some experience with analgesia, will not require much more attention in this regard than the simple statement of the purpose for which the measure is to be resorted to and the results to be attained.

The explanation of the purpose and method of administration should be brief but concise. It should in all cases, state that the condition of unconsciousness is not desired, that we are depending upon patient for some slight assistance which requires him being in a conscious condition.

Make plain that while there shall be no lack of consciousness, no pain whatever shall be experienced.

In cases where necessary, state that co-operation on patient's part is essential to success.

Neither after beginning of analgesia, nor at any other stage should any action or expression be allowed which might convey an impression that the operator, himself, lacks confidence. Never ask if it hurts. This question exposes you to patient as not having complete control of everything and impairs their confidence.

Visitors with patients should not be permitted to talk to or hold hands, or in any other manner interfere with the patient.

No noise or loud talking should under any circumstance be permitted in the operating room. The more tranquil and quiet a patient is allowed to be the greater the chance for success.

3rd. Application of anesthetic.

Under the heading we must first consider our machine and gas supply.

In this matter I believe that one may enjoy good results, altho employing the simplest or most primitive of machines, providing his experience has enabled him to develop technic, but as in other classes of work, I believe that good and modern instruments tend to improve our results. In the case of beginners a good machine is indispensable.

The principle virtue of any machine is

simplicity. It should be such that the gas is controlled in such a manner that we may increase or decrease our supply instantly and at all times know exactly the quantity we are permitting our patients to inhale.

The inhaler also should be of simple construction, permitting the greatest range of admixture of gases with the atmosphere.

Before adjusting the inhaler to nose see that air ways are completely open; also all necessary valves on machine except the one for releasing gas. Allow Nitrous Oxid bag to be almost collapsed.

Now instruct patient that all that will be necessary will be to continue in the ordinary manner without any special effort, breathing entirely thru the nose.

Apply inhaler and discourage all attempts of patient to talk. Release a small amount of gas, say at rate of 20 gallons per hour; after this allow four minutes to pass without any interference at all with patient, at which time, in the average case the patient will be in a condition to allow of a very careful beginning of operation.

At this point we are allowing patient to breath a mixture which contains a maximum of atmosphere as a diluent, and we are not entirely certain that our patient is in the proper condition for the operation. We must ascertain in the only available manner open to us, by beginning to operate.

4th. Performance of operation.

This is the critical moment, we should exercise the greatest caution about inflicting any pain.

We must not forget that the patient's mind is full of doubt and we must dispel this doubt and replace it with confidence. Therefore all depends upon the manner in which we begin our operation.

It is advisable also that in planning our operation, we should arrange for a continuation of our work, one preparation after another without any unnecessary interruption or delay as some patients will become more or less excited upon taking up work after each interruption.

During the early stages especially, many patients will flinch and pull away, but we must be sure that this is not due to fear rather than pain, before changing the anesthetic mixture. If, however, we find that it is necessary to produce a deeper condition, we may do so either by excluding some atmosphere, thereby enriching our mixture in that way, or by releasing more gas.

In this we must always bear in mind that the longer the duration of the analgesia, the deeper the condition has a tendency to become with a given amount of gas. We must therefore be watchful, for if the patient crosses the margin into the exciting stage, it often becomes difficult to operate, due to unrest of patient.

Analgesia may be deepened and lightened to meet the requirements of the operation by manipulation of air valves on inhaler.

If, as we see sometimes in the case of anemic young men and women some cyanosis is evident, despite the presence of so much air, the condition may be cleared up by the addition of a small amount of oxygen to the mixture.

As in anesthesia, we will meet with patients who will cause trouble and annoyance during any attempt to produce analgesia in their case.

Here again experience will tell inasmuch as it enables one to often recognize certain types and thereby save oneself disagreeable experience by not attempting at all to analgesize patient or to quickly recognize the futility of persistence after a reasonable attempt has been made.

The patient who may thus interfere with the success of our efforts may be classified after a more or less general plan.

The patient most sure to bring failure is the one who is accustomed to the use of strong drink as matter of habit, but the evidence of a recent indulgence, in

the case of any patient, should be sufficient reason to postpone the attempt to induce analgesia; the effect of a few inhalations of Nitrous Oxid and Oxygen upon the patient who has imbibed only a single glass of whiskey, appears to be able to stir to action about all the devils not confined in Hades.

Habitual drug users, either as an uncontrollable habit or as a medical treatment, will be found to be unreliable. Those habitual narcotic users will, when in need of the fortifying effects of a dose of the drug, befound impossible to control. If the condition is suspected, not much time should be wasted in their case.

Patients who make no effort to co-operate with dentist, due to inability, or refusal to exert will power, will be found to be about as unsatisfactory a case as can be imagined; suggestion in these cases avails us nothing for the reason that patient will not dwell upon our statements.

Hysterical patients may, thru careful handling, sometimes be successfully treated thru the power of suggestion plus analgesia, but in every instance caution is advised.

This class of patients produced our most interesting as well as sometimes alarming results; a single inhalation may be sufficient to enable us to complete extensive operations, or we may see conditions develop which may be due to hysteria.

Patients sometimes present, who, under ordinary conditions, may be regarded as average patients in every respect, but who, as the result of some severe mental or physical strain, may temporarily be so hysterical under analgesia as to prevent, or at least, limit our success.

Nausea or vomiting are causes of failure which we sometimes have to contend with.

I have found that in these cases our trouble may, as a rule be ascribed to one of two reasons. Either we have failed to prepare patient properly in regard to fasting, or the patient is a sufferer from some form of stomach trouble and will present a history of easily provoked nausea.

There is an occasional patient, usually a man, in whom there seems to be no margin between consciousness and the exciting stage of anesthesia, in which, due to the unrest of the patient, it is often found impossible to accomplish much in the line of operating.

Children, when amenable to reason, are usually very satisfactory patients for analgesia, a small amount of anesthetic sufficing to produce excellent results. The child, who cannot be prevailed upon to submit quietly, can seldom be treated with full success, but anything at all accomplished is that much gained.

After having acquired more or less experience along this line, the dentist will have developed some technic. From this time on his efforts will be rewarded by more satisfactory and uniform results. I believe that on an average 98% of our attempts will be successful under proper conditions.

Under perfect analgesia nearly all operations which come under the head of operative dentistry may by performed painlessly.

Removal of nerves is not advised, but after exposure has been made, cocaine may be applied, patient still under analgesia, and nerve removed in this manner.

Severe extractions also are not advised, altho simple extractions are possible.

All other proceedings may be brought to a satisfactory termination under this condition.

It should hardly be necessary to mention the advantages which may accrue as the result of anesthesia in operative dentistry.

The advantages are many and result equally to dentist and patient.

The percentage of people who procras-

tinate in having dental work performed, due to fear of pain, must be very large. We owe it to the public as a professional duty, each one of us, to exert our best efforts to become proficient in any method which will enable those people to avail themselves of our services.

On our own part, we will enjoy the advantage of increased efficiency, more work accomplished and no work only partly done, due to insufficient preparation on account of pain.

We will benefit by the conservation of nervous energy which would be wasted upon patient who is unable to withstand pain of operation.

The day of painless dentistry has dawned and every dentist may as well realize that unless he equips himself to meet the issue with the rest, he will surely lose ground. We must realize that there is no middle position to achieve success, we cannot stand still, we must move forward or we are falling behind as the rest of the world moves past.

Energy and ambition will be necessary to keep us in the front rank. "We must remember that it takes a live fish to swim up stream,—any dead one can float down."

LOCAL ANESTHESIA.

INFILTRATION AND CONDUCTIVE METHODS.

By Kurt H. Thoma, D. D. S., Boston, Mass.

THERE are today only very few cases of dental surgery, where local anesthesia is not used to greater advantage, with more safety, promising greater success of the operation, and less discomfort to the patient than general anesthesia. The only cases where it cannot be used, are severe cases of ankylosis of the mandible.

To put patients to the strain and danger of ether, chloroform, or similar general anesthesia, with their psychic, and physic prae and after effects, for difficult cases of exodontia, thus confining a patient for days to the hospital, or the bed, is no more justifiable. Let us compare two operations side by side, one under general anesthesia, the other under local anesthesia; with the former we have general relaxation of the patient, the field of operation continuously obscured by mouth prop, increased venous bleeding and saliva, not to speak of blood and pus, which is swallowed and penetrates into the lungs, and the operation prolonged by endless sponging, which takes up more than half of the time. Under local anesthesia we have a clear view, bleeding almost obliterated, and co-operation of the patient. Between these two it is easy for me to choose, and it also makes it clear why the choice is for the operator and not for the patient.

But local anesthesia does more than replace general anesthesics. It increases the possibility of painless dentistry. With

it we can devitalize a sound tooth, extirpate inflamed pulps, prepare teeth for bridge work, and excavate cavities for ideal fillings. We can work in perfect calm, have plenty of time, and there is nothing to abstract our thought, no danger, no machine to watch, no interruption. It allows us to concentrate our mind on one thing—perfect work.

Local anesthesia is based upon thoro knowledge of the oral anatomy, scrupulous asepsis and exact technic.

INSTRUMENTARIUM.

As apparatus, I use two Fischer syringes, one mounted in a short hub with a 26 mm., the other in a long hub with a 45 mm. iridio-platinum needle. I prefer iridio-platinum needles because it simplifies matters, in that they do not need to be boiled before use, can be used again, and therefore can always be mounted on the syringe ready for use. These do not break. If steel needles are used, which often show specks of rust and oxide, one has to boil them and should only use them once. The platinum needles have to be sharpened from time to time with a round engine stone.

The syringes are kept in a glass jar with absolute alcohol placed on a stand, together with two porcelain dissolving cups.

The dissolving cups are graduated, one up to three, the other up to 10 c. c. and are used to measure, dissolve and sterilize the anesthetic.

The bottle double corked and contains the physiological salt solution.

A glass tray is used to keep tablets and reserve needles.

DRUGS.

1. Novocain.

Local anesthesia is not dependent upon one special anesthetic; but, there is no reason today why cocaine, for which so many patients have an idiosyncrasy, should still be used—it belongs to the past. Among the many substitutes, which all have been thoroly tested out by men like Professor Bram, Novocain is by far the best.

Novocain was produced by Professor Einhorn of Munich. It is as efficient as cocaine, is ten times less toxic remains unchanged when boiled, and its action is increased, when combined with Suprarenin.

The best solution for our purposes is a 2% solution, a change in strength for special cases isn't required. Maximal doses is 0.5 gr.

2. Suprarenin Synthetic.

It is the active substance of the suprareninal glands, synthetically produced, keeps better and is less toxic, than the animal substance. Maximum dose (Fisher 10 drops equal 0.0003 gm. of 1 to 1,000 solution.) It is added to prevent infiltration of the anestheticum into the soft tissue and circulation of the blood.

Different than with Novocaine, I found it of great importance, from practical experience, to change the amount of suprarenin for individual cases. The toxic effect of the suprarenin is dependent from the concentration of the solution. I have observed slight swelling in some cases, which did not occur in the same patients, if the percentage of suprarenin was lessened. Also it is undesirable to have too much anemia in extraction, it causes post operatic pain. The amount which is contained in the E. Tablets is too high.

In all normal cases I found a solution containing 0.0015-0.002% of suprarenin the best.

In Arteriosclerosis and Cardiac disorders, a percentage of 0.001% is advisable.

In cases where strong anemia is desired, the percentage may be raised to 0.005%.

TABLETS OF FARBWERKE HOECHST

This firm produces convenient tablets, These are:

1. Novocain Suprarenin Tablets E., containing:

Novocain 0.02 gram.
Suprarenin 0.00005 gram.

2. Novocain Tablets F., containing:

Novocain 0.05 gram.

I propose to use the following solution:

Solution A: For normal cases of dentistry or extraction.

I. E. tablet—Novocain 0.02 gm. Suprarenin, 0.00005 gm.

I. F. tablet—Novocain 0.05 gm. Suprarenin 0.000,00 gm.

3. 5 c. c. Ringer Sol.—Novocain 0.07 gm. Suprarenin 0.00005 gm.

Solution A.—Novocain, 2 per cent Suprarenin, 0.0015%.

Solution B. For Arteriosclerosis and Cardiac disorders, use:

1 E tablet—Novocain 0.02 gm. Suprarenin 0.000,05 gm.

2 F tablets—Novocain 0.10 gm. Suprarenin 0.000,00.

6. c. c. Ringer Sol.—Novocain 0.12 gm. Suprarenin 0.000,05.

Solution B.—Novocain 2%, Suprarenin 0.0009%.

Solution C. For strong anemia as sometimes required in oral surgery.

1 E tablet—Novocain 0.02 gm. Suprarenin 0.000,05 gm. with

1 c. c. Ringer Sol.—Novocain 2%. Suprarenin 0.005%.

To simplify the preparing of the solutions Farbwerke Hoechst was kind enough to promise the manufacturing of a new tablet, with which a solution can be prepared containing 2% Novocain and 0.000,02 gram. Suprarenin to 1 c. c. This solution is for general use, while the solution prepared from the E tablets should be used for cases only where extreme anemia is required. This new tablet, however, will not come out for several weeks.

2. **Physiological Salt Solution.**

A 0.6% solution of sodium chloride can be used, better is a solution containing all the salts found in the blood. It is more isotonic, and therefore, agrees better with the tissue. Ringer tablets 10 in a tube are in the market. They contain:

Sodium Chloride, 0.050.
Calcium Chloride, 0.004.
Potassium Chloride, 0.002.

Dissolve 5 tablets in 50 c. c. of distilled water, and sterilize.

PREPARING OF THE SOLUTION.

Remove the stand from the jar, and wash the cup and syringe in distilled water, to remove all traces of alcohol. Then fill the cup with Ringer solution to the mark and boil this solution over the flame for a few minutes. Add the tablets, as required for solution A, B, or C, and draw it thru the flame till they are dissolved. The needle on the syringe is sterilized in the flame, and the syringe filled from the cup.

A Novocain Suprarenin solution should always be freshly prepared immediately before injecting, it should be water clear. A slightly discolored solution should not be used.

TECHNIC OF INJECTION.

Preparing of place for insertion of the needle.

An unclean mouth should first be sprayed out, with an antiseptic solution, hold the lip away from the gum, and with a short cotton roll wipe all the mucus from the field of operation. Then with a little bit of cotton dipt in camphophenique, or solution of aconite and iodine, equal parts, sterilize and anesthetize the part where the needle is to be inserted. In very sensitive patients I use a small hypodermic syringe, with a very fine and sharp platinum needle, and inject a few drops of novocain solution previous to the regular injection.

INFILTRATION METHOD.

This method depends upon diffusion of the solution thru the pores of the bone, thus reaching the dental nerve before it enters the tooth. The number of pores is different over different teeth,

and in the upper jaw different from the lower. Moreover, the density of the bone varies greatly in different individuals. Without exception this method can be used for any teeth in the upper jaw. The lower jaw is porous only in the mental fossa while in the region of the back teeth the bone is very dense. The infiltration method, therefore, is not advisable for the lower jaw, except for the four incisors.

INJECTION ON THE LABIAL AND BUCCAL SIDE OF THE MAXILLARY TEETH.

The point of insertion on the labial and buccal side, is half way between the gum margin and apex of the root. The needle is pushed—opening directed toward the bone—down to the periosteum. A drop or two is injected, and after this has taken effect, push the needle slowly, and carefully upwards, if necessary injecting as you go along, till you are opposite the apex of the root. Here inject slowly and evenly, moving the syringe slightly forth and back, to avoid injecting into a small vein. In this manner a depot of 1 to 1.5 c. c. is deposited into the submucous tissue between mucous membrane and bone. Little force is needed to inject. After five to eight minutes, anesthesia occurs in the tooth injected for, sufficient to extirpate the pulp without pain.

ON THE LABIAL SIDE OF THE LOWER INCISORS.

Here the procedure is very much like in the maxilla, often, however, it is easier to insert the needle over the tooth next to the one we wish to anesthetize, pushing it obliquely toward the apex of the tooth in question.

PALATAL AND LINGUAL SIDES.

The palatal gum of the maxilla is supplied, by the anterior naso-palatine nerves, therefore for surgical operations, an additional injection to produce anesthesia of the soft parts is required. The same is true for the lingual gum, in the mandible, which is supplied by the lingual nerve. For these injections we start at the gingival margin, push the needle down parallel with the process, and inject 0.25 c. c. again into the part which takes up the solution the easiest; the submucous tissue.

The anesthesia lasts more than one hour, and the injection can be repeated, if necessary, massage of the injected area quickens the result.

II. CONDUCTIVE METHOD.

To anesthetize the molars and bicuspids in the mandible, and if the infiltration method is contra indicated, in the maxilla, on account of septic conditions, we take resort to the conductive anesthesia. For large surgical operations, we use both combined, to get extensive anesthesia combined with anemia.

In this method the conductivity of the main trunk of the nerve supplying the teeth and tissue in the oral cavity is intercepted or blocked at a convenient point, while in the infiltration anesthesia the drug acts on the peripheral nerves.

A. Conductive Anesthesia of the Mandible.

For purely dental operations we need only anesthesia of the inferior alviolar nerve which supplies the teeth. It enters the mandible thru the mandibular foramen. For anesthesia of the molars and bicuspids on one side, one injection over the mandibular foramen into the pterygo-mandibular space is sufficient. The cuspid and two incisors are sometimes also anesthetized, sometimes remain slightly sensitve on account of the anastomosis from the other side. An injection into the mental fossa, is needed in the latter case. For anesthesia of all the lower teeth, one should use two injections, one over each of the mandibular foramina.

For surgical operations we not only need anesthesia of the teeth, but also

of the soft tissues surrounding them. On the inner side this region is supplied by the lingual nerve, on the buccal side by the inferior alviolar nerve, and by the buccinator nerve in the region of the first and second molar and second bicuspid. Therefore, we need anesthesia of the lingual and buccinator nerve in addition to the alviolar.

1. Pterygo-Mandibular Injection.

Palpate the postmolar triangle with tip of index finger on the left, with the tip of the thumb on the right side, with the other fingers fixing the jaw. Prepare place of insertion as described above, place syringe (mounted with 42 m. m. needle) between cuspid and first bicuspid of opposite side and insert it in the mucous membrane 1 c. m. over the last molar and try to feel with the needle the internal oblique line. Then slide it a little more medially and push it forward, keeping in close contact with the ramus. This may necessitate a different direction of the syringe according to the angle of the ramus to the median line, which varies.

After the insertion of the needle inject a small quantity. Now comes the distinction for dental and surgical anesthesia. The lingual nerve lies enterior and medially of the alviolar nerve, half way between the alviolar nerve and the mucous membrane. Therefore, by depositing one-third of the solution when the needle is half way in, we will anesthetize the lingual nerve, the rest being deposited into the pterygo-mandibular space, thru which the alviolar nerve and vessels pass, that is when the needle is inserted to its full extent.

If we want anesthesia of the alviolar nerve only, we do not inject until the needle is inserted to its full extent, so avoiding anesthesia of the lingual nerve, depositing 1.5-2 c. c. at the alviolar nerve. Anesthesia occurs in from fifteen to twenty minutes, and lasts at least one hour. For longer anesthesia inject two syringes full, or 4 c. c. at once.

This injection is the least painful, and most ideal as the injection is made at a place, quite distant from the field of operation.

2. Buccinator Injection.

For the buccinator nerve make one injection either directly into the mucous membrane supplied by it, or, in case of inflammation by conductive anesthesia, inserting the needle just below Stenson's duct.

B. **Conductive Anesthesia in the Maxilla.**

The neurology of the maxilla is more complicated. The upper teeth and buccal gum are supplied by the anterior middle and posterior superior alviolar branches, the palate and palatal gums by the anterior and posterior palatine nerves, branches of the spheno-palatine ganglin.

1. The Spheno-Maxillary Injection.

Palpitate the zygomatic process of the maxilla, preparing the place of insertion as above and sliding the long needle upward, backward and inward, depositing the solution while injecting. In this manner the two posterior superior branches are crost by the direction of the needle, which produces anesthesia in the three molars, two bicuspids and buccal part of their gum. Inject 2 c. c. Anesthesia occurs in ten minutes and lasts one hour.

2. Infraorbital Injection.

Palpitate the infraorbital foramen, and put the tip of the index finger upon the place. Insert the long needle in the canine fossa, and push it along the bone till felt under the finger tip. Inject slowly 1-1.5 c. c. and apply massage. Anesthesia of the incisors and cuspid occurs in ten minutes.

3. Incisive Injection.

If Anesthesia of the first part of the palate and palatal gum is desired, we insert the needle in the median line, be-

tween the two upper central incisors. Push it along the bone and you cannot fail to get into the incisive foramen. A few drops produce anesthesia in five minutes.

4. Posterior Palatine Injection.

To get anesthesia of the posterior palatial part of the gum, the needle is inserted over the inferior part of the third molar, (in children, over the last molar present) working slightly upward and backward. A few drops are sufficient. If more than 0.3 c. c. is injected, anesthesia of the soft palate occurs, which is undesirable.

PSYCHOLOGICAL EFFECTS.

In this age of nervousness and hysteria, the patient's mind and imagination plays a great part in the success of the injections and operator, and it is well to say a few words in regard to the attitude of the operator toward the patient.

We get so accustomed to our work, that we neglect to realize the fear and terror some sensitive patients experience previous to an operation. We forget that many people make it their pastime to talk about nothing else but symptoms, cures and operations of diseases and that some are walking encyclopedias of the ill-effects, accidents or after-effects of drugs and spread their knowledge among their friends. Some associate every syringe with cocaine, and are terrified of cocaine poisoning, and others are alarmed by the numbness produced by an anesthetic, confusing it with paralysis.

Sometimes the respiration is increased, and the patient perspires on the forehead; this is very frequently a fear, and often is seen after insertion of the needle before a drop is injected. The best example is one of the cases I demonstrated on at the Massachusetts State Society meeting in 1913. While explaining the technic of the injection to the audience, the patient—a mail-carrier—of about 30 to 35 years, collapsed. I had not made any injection, but the patient who was weakened from severe pain, collapsed from fear, caused by the explanation and description of the operation.

It is fear which we have to conquer, in all these cases, and the antidotes are, convincing attitude, sureness of result, confidence of the operator in himself, and in his success, which will result in confidence of the patient towards the operator. It is well to tell the patient that Novocain has absolutely nothing common with cocaine and is entirely harmless. Tell them what parts are going to feel numb, so that this does not alarm them.

I have used local anesthesia in children, and in adults up to eighty, in patients who collapsed from cocaine, and who have been warned not to have another injection, and I have repeatedly used on patients with severe heart and pulmonary disorders of all kinds. In these cases you can, to go entirely safe, decrease the amount of Suprarenin.

AFTER EFFECTS.

If there are after effects, they come from deteriorated drugs, false technic injecting into pathalogical tissue, injecting into muscle tissue, or from too large percentage of Suprarenin.

There are swellings which disappear without treatment and pain which can come from above sources, or from infection during or after the operation. Such an infection is also invited by too great anemia, produced by too large percentage of Suprarenin. Pain is relieved by cold applications and administering Aspirin or Trigeminin.

However, if we are perfected in the technic and eliminate any danger of infection, we have little to fear of ill-effects. These form a negligable percentage; but great is the achievement of local anesthesia. Great the ability to perform with it operations, which

could hardly be undertaken otherwise in the shortest time and the possibility to do away with the dangers and after effects of ether and chloroform in minor operations about the oral cavity. Personally I can assure you I would not know how to get along without it. Local anesthesia has spread rapidly in New England and New York City and I hope that we will find it to become—just like the radiograph, a necessity in the practise of modern dentistry.

HIGH PRESSURE ANESTHESIA.

BY THE USE OF A SYRINGE AND TWO PER CENT. AQUAOUS SOLUTION OF HYDROCHLORATE OF COCAINE.

By W. T. Jackman, D. D. S., Cleveland, Ohio.

AS A PART of a symposium on painless dentistry the program committee requested the speaker to write a short paper on High Pressure Anesthesia. Why he was chosen is not quite clear, except possibly, that the committee knew this to be his hobby and that probably he could ride it as respectably in the presence of a critical audience like this, as well as any other. If he does not succeed, blame the committee.

Down thru the years, ever since the beginning of dentistry, the prayer of both the profession and laity has been for some power, some method, some modus operandi whereby dental operative procedure might be made painless, or at least less painful. This power was discovered, with its technical application, more than eleven years ago—positive, definite, sure. But alas and alack! because some patience, perseverance and tact are required to master the technic, for practical results, the rank and file of the dental profession has elected to go on in the same old way, thus saying in effect, "If they want me to operate on their teeth they must bear the necessary pain." That word "necessary" used in this connection should be forever stricken from the vocabulary of every dentist the whole world round. For to wantonly inflict the tortures of the damned on a fellow mortal before he has reached the realms of his Satanic Majesty is not, to say the least, humanitarian dentistry. To run a bur into sensitive dentin is a wanton thing to do, wholly inexcusable and without warrant.

After these many years of most satisfactory results with the high pressure syringe the writer feels fully justified in making the above statements. My fellow practitioner, the one who is not here but who will read this, are you traveling in the same rut you were in fifteen, twenty or twenty-five years ago! If so, call for a ladder and climb up and out into God's sunshine. Why, man, the automobile, the areoplane and high pressure anesthesia have been discovered and made practical since then! If you do not come up and out the condemnation of the Almighty should rest upon you and His

infinite mercy and compassion upon your victims. Now, my friends, inasmuch as the writer hasn't the least desire to hurt any one he will proceed to tell you how he doesn't. About thirty-five years ago the cocaine alkaloid was first marketed. The writer well remembers paying one dollar a grain for what was not as good as that which can be purchased now for about a cent a grain. What a blessing it is to humanity when rightly used,—one of God's choicest gifts to man!

Many years ago Indians were employed instead of pack horses to carry loads across the Andes Mountains in South America. It was noticed by travelers that these fellows, tho not large, were able to carry enormous loads. It was also noticed that they were constantly chewing coca leaves which are found in abundance in that part of the world, (Peruvian Coca). A shrub (erythroxylin coca.) (These leaves resemble tea leaves in size, shape and odor, and are a powerful nerve stimulant) and while chewing these leaves they had, temporarily, the strength of giants. This led chemists to extract from the coca leaves that which seemed to give super human strength to those fellows and called it cocaine. Cocaine then is, primarily, a powerful nerve stimulant and its second effect is a still more powerful sedative. The sedative effect is, of course, the one we want for obtunding purposes. Now, please bear in mind the dual effect of cocaine as we proceed to use the syringe with a 2 per cent. aquaous solution. We should use sufficient amount only of the solution to carry the effect just beyond the primary stage and just within the secondary, or sedative; to push it further may injure the pulp by mechanical means; for you will recall that the pulp chamber is already full so that if you force more into the pulp than it can absorb, it acts mechanically and will strangle it. Like all other drugs when given in overdose it becomes harmful. If you will follow closely the description of the use of the syringe you will see how the solution may be used without overdose. Let me say, first, that next to receiving first-class operations there is nothing that fills the heart of the patient with so much gratitude as to have had those operations made painlessly. Painlessly? Yes, for when the gum is cocainized for the adjustment of the dam and then the pulp is put to sleep for cavity preparation, you have removed every part of the operation worthy the name of pain. How restful, too, to the operator! for there is no occasion for the patient to draw on his sympathy.

In my practise at least ninety-nine per cent of the teeth are sensitive and a very large part of these are hyper sensitive. So you see it becomes necessary to use high pressure in nearly every operation. I always seek to completely desensitize the pulp for two reasons; first, that I may not hurt the patient and, second, that there may be no shock to the pulp from condensing the gold. By way of illustrating the use of the high pressure syringe let us select any tooth with gingival cavity—the most sensitive, probably, of all. Let this particular tooth be, if you please, an upper left first molar. Let us suppose the patient to be a miss of fourteen summers. The first thing to do is to assure her that she will not be hurt; then proceed to keep the promise, by first having the assistant obtund the gum margin with a 3 per cent. aquaous solution of cocaine; this she does by using a tightly rolled pledget of cotton about the size of a pea; this she picks up with the pliers, dips it in the solution and then with gentle pressure applies it to the gingiva for several minutes. When well obtunded apply the rubber dam in the usual way. If, however, the solution is cold it should be warmed by passing the saturated pledget quickly thru the flame of an alcohol or gas lamp. After the dam is adjusted use a

No. 3 round bur in a true running hand piece in the most available place; other things being equal, just outside the cavity—never within the cavity. **The cocaine solution must be forced thru healthy dentine to the pulp.** If the syringe is used in the cavity of decay where the dental tubuli are clogged the chances are the solution will not be forced thru and if forced thru the debris will also be forced thru which will infect the pulp and probably cause a severe pulpitis and a little later its death.

Use the No. 3 round bur and cut about one-third of the way thru the enamel; then use a No. ½ round bur in the center of the pit made by the No. 3 and cut thru another third of the enamel, (Here explain how to make pit by use of blackboard) when the pit is ready for the syringe. The point of the syringe shoult fit the pit, the pit made by the No. ½ round bur. Now fill the syringe by placing the point in the solution, open the handles and the instrument is ready for use. Grip it dagger fashion, place the point in the pit, press gently and close on the handles. If the contact is perfect the handles cannot be closed. If perfect contact is had then brace the tooth by counter pressure with the index finger of the left hand, close as tightly as possible on the handles for about thirty seconds, when the solution will have been forced thru the cement substance between the enamel rods slightly into the dentin. Now use the No. ½ bur and cut thru the other third of the enamel and slightly into the dentin. Up to this point no pain has been given the patient, for you will remember there is no sensation in the enamel and as the cocaine has entered slightly into the dentin, no pain was given when entering the dentin with the No. ½ round bur. If difficulty is had in making contact, lay a few fibers of cotton over the pit and the difficulty will be overcome; these fibres do not interfere with the action of the syringe because the force extended by it is so great.

We are now ready to do business, but doing this requires caution, for, remember, we want to force the minutest part, only, of a drop into the pulp. This can be done by scientifically counting, inaudibly, a second to a count; this can be learned with a little practise by standing before a regulator in a jeweler's shop.

The age of the patient must always be taken into consideration, indeed this is the guide that the syringe be not used too long,—the younger the patient, the shorter the time. As you know, the younger the patient the larger the dentinal tubuli. The patient referred to would, with perfect contact, require about 75 counts to obtund the pulp. Remember one does not always get perfect contact but just in proportion as perfect contact is approximated, in that degree the desired results are being obtained.

The high pressure syringe, when properly used, is one of the greatest conceivable blessings to humanity; but when improperly or carelessly used may be an engine of destruction; therefore, it must be used intelligently for no haphazzard way will do. Using it the latter way is what cause so many to fail. The pit made in the healthy part of the tooth must be taken into the cavity proper in the final preparation; but leave the pit until the last for sometimes the anesthesia is not deep enough to last thru the entire preparation and when this is so a few more seconds' use of the syringe will again completely obtund.

Now, my friends, in a short paper like this the explanation of the use of the high pressure syringe must of necessity be somewhat general, but here let me assure you if you become master of this little instrument it will bring to you unending satisfaction and infinite joy to your patients.

Discussions.

Dr. C. W. Bruner, Waterloo, Iowa.

After many years of patient "Watchful Waiting," war has been declared on the arch enemy—Painful Dental Operations. In the hands of the dental profession alone, is the issue of the warfare.

Our first essayist, Dr. DeFord, has well stated: "The dental surgeon stands indicted by the general public, as the most cruel, barbarous and inhuman of medical specialists." We have suffered under this indictment, together with our patients, all too long. Why stand longer under such a severe indictment? Because our fathers rode in oxcarts, shall we decline an invitation of the "Chicago Contingent" to come to this convention on an all steel equipped, electric lighted train, that, while we sleep, speeds across country, to this city from the little village on the lake front? We say, NO! Rather, let us accept the knowledge and light we now have, and with the modern armamentarium placed in our hands by Horace Wells, Morton, their followers and our present day leaders in this propaganda, not least among whom is Dr. W. H. DeFord, of Iowa, whose paper, I esteem it an honor to discuss here today Let us, I say, accept modern anesthesia and analgesia as our equipment to battle with the enemy—PAIN.

Dr. DeFord, in his excellent essay, presents to us for consideration at this time, Somnoform and Gas-Oxygen, as ideal agents for the induction of dental anesthesia and analgesia.

Having had more experience with Somnoform, I shall confine my discussion more particularly, to this agent.

Somnoform has been a daily adjunct in my practise for some considerable time. I wish to state that its beneficent offices have been so gratifying to both my patients and myself that I sometimes fall to wondering how I would get along without it.

In considering the advisability of adopting any anesthetic in our practise, the first inquiry is: "Is it safe?" It is well that this is so. Somnoform has proven its right to the claim of safety. Among my early experiences with somnoform is that of anesthetizing a two week's old babe for an operation of circumcision. The anesthesia and the operation were both successful.

At the Alumni Clinic of the College of Dentistry of the Iowa University, a dentist appeared with his wife to study the effects of administration of Somnoform for analgesia. This lady, having some heart lesion, had been warned by her physician while enroute to the city that under no circumstances should she take an anesthetic, of any kind, in any manner, for any purpose. Her teeth were sadly in need of repair. She dreaded having them touched. Her husband feared to undertake the operation. What was to be done? They, together, witnessed the induction of analgesia by Dr. DeFord, of some six or eight subjects.

Dr. Chase, professor of Materia Medica of the College of Medicine, was an interested witness.

The heart lesion and general condition of this lady, together with her needed dental operations and her physician's ultimatum, were all gone over carefully in consultation with her husband, Dr. Chase, Dr. DeFord and myself. It was decided she should try analgesia. With Dr. Chase's finger on her pulse at her right wrist, my finger on her left pulse, Dr. DeFord gave analgesia. Her husband, much surprised at her taking it so nicely, hastily procured a dental engine and a dull bur and begun the preparation of a very sensitive cervical cavity, without pain. Indeed, a complete preparation of the cavity might have been effected just as well, had he been equipped with a sharp bur. The patient, before and in the early stages of the operation, as you may well infer, was in a high state of nervous excitement. As the work progressed, she was calmed, with pulse

slightly accelerated, and on stepping out of the chair, she declared that she felt much better than at any time since she left home the day before. Believed with the aid of somnoform she could have her teeth repaired.

At the 1913 meeting of our Iowa State Dental Society, Dr. J. A. Bliss and I were scheduled to give Somnoform Analgesia clinics. Dr. H. S. Engle, a dentist of Lineville, Iowa, desired to have several cavities prepared and filled. Dr. Bliss and I worked together. With rubber dam adjusted, analgesia was induced; the separator applied between superior central and lateral incisor and two cavities prepared and filled with Symhetic Porcelain. After an interval of some ten or fifteen minutes, the separator was removed. The patient now, for the first time during the operation, gave evidence of pain. A remark that the removal was more painful than the application of the separator elicited the response from the patient that he could not nor would he have stood is application without the analgesia. Without removal of the rubber dam, analgesia was again induced, the separator applied between central and lateral of the opposite side and two like cavities prepared and filled, with results like as the first.

Much has been said and written regarding the mental susceptibility of the patient to suggestion during the early stages of anesthesia. The essayist, Dr. DeFord, has here given us some very clear, forceful and valuable thoughts along this line.

The importance of suggestion as an aid to analgesia and anesthesia can not be too strongly urged. It is a well known fact that some skilled anesthetists are able to induce profound anesthesia with a surprisingly small amount of anesthetic, whatever agent is being employed. The secret of their success, we are told is in the employment of this valuable adjunct—SUGGESTION.

"Results obtained by Alice Magow former chief anesthetist to the St. Mary's Hospital, Rochester, Minnesota, at the Mayo Clinic, are almost beyond belief. Ether is her favorite anesthetic. She obtains surgical anesthesia in from three to four minutes. In reply to the question, "How do you do it?" she will make answer, "I simply talk them to sleep."

A young woman whose teeth have been under my care for some eight or nine years, recently reported for further attention. Of nervous temperament, her teeth so sensitive and her dread so extreme, she always delays her visits until forced thru pain or from parental persuasion, to visit the dentist. On this occasion, procrastination had resulted in her presenting with more than the usual number of cavities; also with an extra ordinary degree of sensitiveness. Somnoform analgesia was explained to her. "O, yes!" "She would do anything I might ask of her, for the relief of pain. We gave analgesia with only partial success for the preparation of two cavities. She went home with a favorable impression of the method, however, and on returning for subsequent sitting, we explained to her again that she was not expected to go to sleep, but rather, must keep awake, that the anesthetic was largely under her control; that she would know all that was being done, but would feel no pain; that she had confidence in the operator, she must also have confidence in herself and the anesthetic; that her co-operation with us and the anesthetic was absolutely necessary to success.

Being thus prepared, the rubber dam was applied over the six anterior teeth. Analgesia was induced and at the proper stage pertinent suggestions were offered, to which she responded most beautifully. We succeeded in the preparation and filling of four proximal cavities without so much as the slightest expression of pain in face or muscle. She declared it a "God send" to her. You may well under-

stand her appreciation when I say: on a number of previous occasions I had found it necessary, after exhausting every effort and means then at my command, to devitalize and remove pulps before fillings could be made. This often necessitating from three to a half dozen sittings for a single filling.

Environment plays a very important part in the success of our analgesia work. This has been very well brought out by our essayist. His reference to the susceptibility to mental impressions thru any and all of the five senses are patent. In many cases the sense of hearing is wonderfully magnified. The slightest noise about the operating room, calling vividly to mind scenes of railroad wrecks or the crash of falling buildings. Hence I would caution: do not permit any talking, except what you do yourself directly to the patient, and this in a low tone. The rattle of instruments should be avoided. Do not even permit the ringing of a telephone bell in the operating room, much less suspend your attention to your work to answer the phone or to even permit your assistant to do so, less the sub-conscious mind of your patient be so disturbed as to cause your analgesia to result in failure.

A recent experience so impress this upon my mind, that I am constrained to give it to you here; humiliating as it may be. We had gotten nicely started in the preparation of a large poximo-occlusal cavity of an upper molar, progressing swimmingly, cutting deep with bur in sensitive tissue, under analgesia. The telephone bell rang in the waiting room. Leaving my assistant to continue the analgesia, I stept to an extension phone at my desk on the opposite side of the chair and answered the call, in a low voice. The mischief was done. On returning to the chair, I found my patient in a nervous, excited state, just ready to break into tears. I had not been away from the chair a half minute. It seemed to her a half hour. The continuity of the sub-conscious mind, which had been fixt upon the operation being painlessly performed, was now broken. We were obliged to dismiss the patient and complete the operation at a subsequent sitting.

While general anesthetics are not a panacea for all the aches and pains that present at our offices, yet when understandingly and properly used, they will do much to alleviate the pain incident to dental operations.

To those who are employing these valuable agents, permit me to say: Do not let a failure, now and then, discourage you. By your failure today, you are equipped, the better, to handle your case tomorrow. To those who contemplate the adoption of general anesthetics in your practise, I do not know how better to close this brief discussion than to suggest that you make a thoro study of the subject. Get a good text on anesthetics. Investigate the subject from all angles. Yes, from the purely selfish standpoint, if you wish.

Nothing has ever, in my practise, brought to me so much comfort and satisfaction and so many expressions of gratitude from my patients.

Dr. George N. Wasser, Cleveland, Ohio.

What has been said by the last discusser pertains largely to nitrous oxide as well, so I will not repeat any of it. There are just a few points I wish to bring out in regard to the use of U 20. Dr. Henahan has already given the technic of administration. One point is the use of the hand cuspidor in analgesia. It helps wonderfully. One of the great mistakes operators make in working under analgesia is the tendency to hurry. You feel you must get thru so you will have a clean field and keep the field of operation clean. By the assistant holding the hand cuspidor to the patient's mouth, and also at the same time taking the hand and raising the patient's head off the headrest, so as to bring it

near the cuspidor, and by the use of the warm water syringe you can wash out the cavity and keep it free from saliva and debris as often as you want to. There is no excuse for rushing thru the work. It is a good idea to explain to the patient, before you start the analgesia, the use of the hand cuspidor; otherwise, they will attempt to get up to the chair cuspidor.

Dr. Henahan's definition of analgesia as being a state at which the appreciation of pain is lost, or materially lowered, without loss of sense of touch or consciousness, is a good one. I frequently use the word "intoxication." People know what that means, and it doesn't take much effort for them to grasp it. A mild state of intoxication is really what analgesia is. The first requisite of success is to secure the confidence of the patient. A halting, hesitating manner on the part of the operator is sure to make the patient apprehensive. I know of no way to so successfully overcome this nervousness as a familiarizing with the agent to be used, and one of the best ways to familiarize yourself with it is to read all you can get hold of about it. Every manufacturer of gases and machines has for distribution papers by some of the leading users, giving all the necessary information of the technic of administration. Dr. De Ford's book on "Anesthetics in Dentistry" is an excellent work. Let the beginner administer it to himself. It not only gives him confidence in himself, but it enables him to explain to the patient taking it for the first time just what he may expect.

Relaxation has been mentioned, and that is quite necessary Do not allow the patient to grasp the arms of the chair or brace himself in the chair. The hands should be picked up and dropt in the lap, then you can tell whether or not the patient is in a state of relaxation. Sometimes it is necessary, in the case of extremely nervous patients, to administer something beforehand. I use an article called Bromural. It is a proprietary article, but the formula is on the package.

Dr. Henahan spoke of keeping of the patient's mind free from any responsibility on his part. There are just a few exceptions I would make to that. One especially is with regard to breathing. I explain to the patient that the agent is under his control. It is not absolutely, but it is largely, and nothing gives the patient so much confidence as to feel that they have this under their control. I instruct them to breathe a few times, and then make a few tests by pinching the hand, or asking them to bite the finger. A patient under analgesia will miss direction, and not be able to hit the mouth the first time, and by explaining to them that it is under their control, it gives them confidence, and they feel they are not being hurt, and it is that comfortable stage of intoxication that they are in. When they get to that stage and are not being hurt, just instruct them to breathe thru the mouth. The paper was a very good one. I enjoyed it much, and am glad I was permitted to hear it. (Applause).

Dr. Charles M. Proctor, Boston, Mass.

I am in hearty sympathy with everything that Dr. Thoma has presented the assembly in his essay. Local anesthesia is a subject which has played a lively part in my career as a practitioner of dentistry for the alleviation of pain is the ideal which every dentist endeavors to attain. Dr. Thoma has presented the technic and instrumentarium in a very clear and concise manner. There is nothing on this subject which he has suggested that I would change or add to. He is to be congratulated on presenting a paper, the instructions in which, if executed, would surely bring good results to any operator.

In discussing this paper, I would like to supplement it with some of the experiences which I have had in over 500 recorded cases. Of that number, I have record of only twenty-six out of the nor-

mal and which I feel are worthy of your consideration. Seventeen showed decided symptoms of intoxication to a greater or less degree. Six of these were of the first ten patients to whom I administered Novocain-Suprarenin; four of which I feel were due to faulty technic. Two only lapsed into a state of coma. The first was that of a case of exodontia of the lower left molars, of a man sixty-four years of age, before I had injected more than 1 c. c. of a 2% solution, went into a complete state of collapse, coma lasting for about five minutes. I administered Aromatic Spirits of Ammonia by inhalation, with no results, followed by Hypo. of strychnine 1-60 gr. and Amyl-nitrite inhalation. After the agony was over, I questioned him closely regarding his previous history, and found that he had been under treatment for chronic Bright's disease for over two years.

In twelve of the seventeen cases there has been a history of some kidney trouble, therefore, I believe that it is absolutely necessary, before administering this drug, to ascertain for your own protection and guidance, so far as possible, the previous history of the patient.

The other was a case of pulpitis in the upper right second molar of a woman, twenty-eight years of age. The patient had been troubled more or less with toothache for a week, but, for twenty-four hours previous to her visit to me, had suffered constant severe pain. I injected 2 c. c. of a 2% solution made from Novocain-Suprarenin Tablets "E." In about a minute and a half I noticed a marked pallor and perspiration, patient complaining of a deprest feeling about the heart, and that she had difficulty in breathing. I placed her in a reclining position, administered Aromatic Spirits of Ammonia by inhalation, taking her pulse, I found it very erratic, and that she was fast losing consciousness, the pulse being decidedly intermittent and thready. I immediately administered a hypodermic of strychnine, 1-60 grain, and followed it with Amyl-Nitrate inhalation, with good immediate results. She lost consciousness for about 30 seconds. After she had recovered, I found that there was a complete anesthesia of the tissue surrounding the tooth, so I extirpated the pulp, filling the canals at a subsequent time. The previous history of this case was normal, the woman was in perfect health, excepting for a certain degree of neurosis produced by the unceasing pain of the tooth involved, together with the fact that she was at the time on a menstrual period.

These two cases happened during my first administering of Novocain-Suprarenin, and I have often felt that if my courage and enthusiasm for painless dentistry had been any the less, that I might have been justified in discontinuing its use.

I have only had two other cases which have required a hypodermic injection, and those were given as a prevention for collapse, thinking it better to keep the patients with me, than having to bring them back.

In making records, I have taken the history of each patient together with the action of patient during the anesthesia.

I have always taken the pulse of a patient before and after the administration of Novocain, and keep same for reference. I find, invariably, that a second administration is received by the patient with a far greater degree of comfort. Following is a chart:

Name.
Age.
Case.
Normal pulse.
Pulse immediately before injection.
Pulse immediately after injection.
Pulse five minutes after injection.
Pulse ten minutes after injection.
Pulse after operation.
Strength of anesthetic.
Amount of anesthetic.
Period of anesthesia.

Remarks. Here is written the history and action of the patient during anesthesia.

I have found that in ninety-five per cent of the cases, there is an acceleration of heart beat of about twelve per cent, followed in about two minutes with a decrease in cardiac pressure. It is at this time that the patient should be watched closely for here is where toxic symptoms will appear if the patient is so inclined, and, if so, is the time to administer restoratives to prevent collapse. In every case of intoxication of which I have record, the symptoms were displayed within three minutes after injection, so one can be assured that unless toxic symptoms appear during this period that the chances of intoxication are practically nil.

I have had four cases where I have been unable to produce anesthesia, three were where a solution was made from the tablets of a certain vial, and in none of the solutions used was I able to obtain any degree of anesthesia. I have just returned the remainder of the tablets to the manufacturer for analysis, thinking that perhaps by some mistake the tablets were not compounded properly. The other was where I made too weak a solution and happened during my early use of the anesthetic.

I have only had two cases of post operative swelling, six cases of post operative pain, and this was controlled by administering Trigemin.

I cannot close this discussion without paying tribute to the man who has done so much to bring about local anesthesia in the practise of dentistry. I refer to Dr. Guido Fischer, of Marburg, Germany. It was my pleasure to be enrolled under his instruction during the past Spring, and to come in close personal contact with him for several days, a man of strong personality, and possest of that marked characteristic of all true Germans who endeavor to extract the last scientific detail of any subject which they undertake, and for this and various other reasons, the dental profession and their patients owe Dr. Fischer a debt of lasting gratitude.

Dr. W. G. Ebersole, Cleveland, Ohio.

The two most important questions confronting the dental profession today, to my mind, are, first, the prevention of the necessity for dental operation, and, second, the performing of dental operations absolutely free from pain. I would like to digress a moment to touch upon the question of anesthetics as a whole. Seven years ago I undertook to criticise a paper written by one of the essayists, and published broadcast in this country, dealing with somnoform. I criticised this article in the Humanitarian Department of the Dentists' Magazine of which I was editor. The result of that criticism was the hottest kind of a reply from the essayist, the hottest letter I ever received (Laughter). It was so warm it almost burned my fingers. I didn't know the essayist then; later I met him, and we are great friends now. In that letter he told me I knew nothing at all of somnoform; if I did, I wouldn't write as I did. I thought I did know something of somnoform, but I now say to you I know nothing, comparatively, about somnoform, altho I didn't let him know it at that time (Laughter).

I believe nitrous oxide anesthesia, or nitrous oxide gas and oxygen is the safest anesthetic known to mankind today, safer to operate with it than without. I make that statement from a broad practical experience in administering it, and from actual experience under the gas as an anesthetic, several times for major operations, and I say to this audience that if it were not for the successful scientific administration of nitrous oxide gas and oxygen by one of the most expert men in that line in this country today, I wouldn't be permitted to be upon this platform this morning. I owe my life to nitrous oxide and

oxygen anesthesia, and the successful use of oxygen in the hands of an expert operator, following a very grave abdominal operation, even after the operating surgeon had pronounced to those about, "You are working over a corpse." Before the operation was undertaken, we were told that there was one chance in a thousand to live thru the operation. We took the chance, specifying that nitrous oxide and oxygen should be used.

As to the use of cocaine or novocaine, local anesthesia in the mouth, I have had considerable experience along that line. I haven't, however, made an injection with a hypodermic syringe into the soft tissues of the mouth in a number of years, and yet I believe in it. If you can use nothing else, are expert with nothing else, and can use that, by all means, use it and prevent the pain.

As to Dr. Jackman's paper, High Pressure Anesthesia, administered as described to you today, intelligently handled,—and all anesthetics must be so handled,—offers the safest and easiest method of anesthesia for careful, conscientious, correct cavity preparation. And yet the high pressure syringe can be used to the extent where you will destroy the pulp. So, again, can chloroform, ether, somnoform, about which I know nothing (Laughter), nitrous oxide anesthesia, local anesthesia with a hypodermic, all will destroy tissue and life if improperly handled. I do not agree with the essayist that it is necessary to completely anesthetize the pulp. To my mind it is not. To my mind it is unsafe as a general practise. Making the injection at the point where Dr. Jackman tells us to make it, test your cavity, inject only so long as is absolutely necessary to benumb that portion of the cavity. That is the farthest away from the initial pit of injection. The essayist says the whole pulp is desensitized. I say no, it is not, it is not necessary, and I can prove that if he wants me to. Just the moment you can successfully excavate that portion of the cavity that is most remote from the pit, stop your pressure and complete the preparation. One of the best men we have had in this country along pathological lines, in discussing the question of high pressure anesthesia before the State Society of Pennsylvania a few years ago, severely condemned the use of high pressure anesthesia, and when cornered by some of the strong advocates of that method, was compelled to say he used the thing now? By taking hold of that syringe, getting complete contact, and then gripping it for so many minutes, because some one unfortunately had written that it required so many minutes to produce anesthesia. What would you expect of a person who would attempt to give ether or chloroform on that basis? How long would it be before you would be killing people? Don't try timing. Use your judgment, your intelligence, and use your anesthetic just as a surgeon uses it, long enough, deep enough, far enough, to procure anesthesia. All anesthesia, general or local, must be considered more closely by the dental profession, if we are to do for the people all that they are entitled to receive from us. No man has any more license to take a large sensitive cavity and prepare that cavity for a patient, requiring many minutes of time to perform that part of the operation, than has the surgeon the right to amputate a leg or arm without anesthesia. It is inhumane. And it is to that old way of operating that is due much of that which we find amongst the laity today as to the neglected condition of their mouths and teeth, neglected. Fear of the pain has pervented their coming to you. Why do I say it is not right for you to prepare such a cavity any more than it is right for a surgeon to amputate a limb without anesthesia? It is the psychological effect, the long drawn out mental agony, that produces a physical condition but little short of that produced in the amputation of a leg or arm. I hope that

our Scientific Research Commission will be able to show to the dentists of this country the condition which is brought about physically by the performing of painful operations in the mouth. They have been telling us what they find in the way of faulty cavity preparation and treatment of teeth, but to tell us the psychological effect produced by the painful excavation of dental tissue would be profitable also. And some day you will believe that the comparison I have made is an accurate one. (Applause).

DR. DE FORD: I have been much pleased with all these papers. I have used nitrous oxide and oxygen for thirty-four years, and am still using it. I have used somnoform ever since its introduction into this country, and am still using it. I find both agents very useful in my practise. While my work has been along the line of general anesthetics, I have never opposed anybody's using local anesthetics, and I never intend to. If you cannot do these things with a general anesthetic, rather than not anesthetize at all; use a local anesthetic. We should prevent pain in the best manner possible, whether it be by cocaine or novocaine or somnoform, nitrous oxide and oxygen, chloroform or ether, I care not. I simply stand for painless dental operations (Applause).

DR. HENAHAN: The point raised about requiring the patient to describe the developing symptoms of analgesia is interesting. I firmly believe, however, the words I wrote in this regard, for the reason that certain patients will present, who are so skeptical that it is impossible by mere talk to convince them that any such thing as you promise is possible. The fact that they retain control of their faculties leaves them to judge for themselves. If you depend on that patient telling you that he feels this way or that, that he has wooden teeth, or feels tingling sensations, or feels any of those symptoms which we here describe, the patient will think to himself, "Well maybe I do feel that way but I know he couldn't fix my teeth without hurting me," and the first thing you know you have increased the amount of anesthetic which you originally intended to use and your patient has gone into the exciting stage where it is impossible to work, you don't know what is the matter, your patient does not answer you and is jumping all over the chair. That is the hard part of analgesia, to be able to differentiate the real analgesia from the exciting stage of anesthesia.

In this plan of mine there is great simplicity in trying to impress the patient that he has full control of all these things and if that will work in the case of a sensible man, why not rely on it to work in the case of all patients.

You must be resourceful and take advantage of conditions as they present themselves and with a little ingenuity and increasing experience, I know that 90 per cent or more of your cases will be successful. The condition as it exists in all matters of anesthesia is this; the knowledge on this subject has increased so rapidly that it has run away from the average man in practise, the man who graduated ten or more years ago. How can this man be furnished with real practical knowledge? He can read until doom's day and if he hasn't any practical instruction along that line, it is of no value. Seeing an occasional clinic at the meetings is not sufficient. I believe the situation must be handled by our dental societies and our local societies, to my mind, are the proper ones to introduce courses of instruction, where the men can be given real practical instruction. This will make it right and ethical, it will give the officers of our societies the opportunity to pick men who understand the subject and it will make it unnecessary for the dentists to pay large sums for their education. It will leave them in their home town, and has many other virtues you can think of

yourself. I hope that suggestion some time will be taken up, because I believe the dentists of the country need that training.

DR. THOMA: I am convinced that all the methods are good methods, and that all can be used to great advantage by an expert and if you have the proper equipment. I will not discuss the different methods but content myself with a short enumeration of the advantages that local anesthesia offers: for local anesthesia we need the least cumbersome and least expensive apparatus, we do not need the co-operation of the patient to accomplish the anesthesia, but have the patient's co-operation during the operation, which is valuable. There is no mouth prop or gag in the way, bleeding is diminished and there is no danger of swallowing or aspiration of blood or parts of teeth. We don't need any assistance with local anesthesia, as for the safe administration of a general anesthetic. And doing both operating and anesthetizing, watching the machine and the effect on the patient is not only against old established principles in surgery, but surely diminishes any man's operative ability. This, I think is a short summary of the advantages of local anesthesia, and I will leave it to the other men to speak for their particular choice. (Applause).

DR. JACKMAN: As to the use of somnoform and nitrous oxide and oxygen, I will discuss the two under the one head. There are so many things the essayists tell you are necessary to take into consideration. When you use high pressure anesthesia, you need not consider any of those things. Dr. Henahan says the patient should fast for three hours in order not to have nausea and vomiting. He also tells us he has great difficulty in using it with people accustomed to using alcohol; and he must be careful about hysterical patients, and it is not well to endeavor to remove pulps for such patients. I don't consider any of those points in the use of high pressure anesthesia; it is not necessary. Simply tell the patient you are not going to hurt her, and then proceed to keep your word. You may not succeed the first, second or third time; you may overdo it, or you may not. I made my notations for six or eight months before I felt I was master of that instrument. It is a delicate matter, but who among us does not want to do things in a delicate way? We don't want to hurt our patients, but we do want to do something to prevent pain. I take age into consideration with high pressure anesthesia, next temperament, next location of my pit, where it is located relative to the position of the pulp. You must consider all of these things; you cannot use the instrument in a haphazard way. If you proceed carefully, you will succeed.

As to the use of novocaine, the essayist told us that cocaine was not best, that he uses novocaine because it is not so poisonous as cocaine; we are told it is seven times less poisonous. I experimented with novocaine to my entire satisfaction. Its effect is very slow; therefore, I do not get the quick results I get with cocaine, and I get just as good results, so far as after effects are concerned, with cocaine as with novocaine. Why should I use novocaine?

I probably did injure some pulps when I began to use high pressure anesthesia, probably did destroy some, but this thing has to be learned. Take deep cavities, sometimes children will present cavities with the pulp almost exposed. The chances are that in 19 out of 20 the pulp will die in that tooth,— that the pulp has already been infected. When the pulp dies, we must get after it. That is all. But don't blame cocaine for doing it, for it will not rot unless an overdose is used.

The Doctor asks me why I use a two per cent cocaine solution. Cocaine is a protoplasmic poison. I have found a two per cent solution strong enough to

do the work. If used stronger, the pulp may be injured, or if used too long, it may be injured. The sheet anchor of all neurologists for nerve trouble is strychnine, the dose is from 1-120 to 1-60 of a grain. If you give the patient a grain, you will kill him. Just so with the pulp, if you give it too much cocaine, you will kill it. In my experience a two per cent aqueous solution is best for me to use. I have come to the point where I do not consider after effects, because I very seldom have any, in the way of pulpitis or the death of the pulp, except in the teeth I mentioned, where we have deep cavities and the pulp would die anyway. I never tell a patient, when I find it necessary to remove the pulp, that I am going to do it, but I just remove it and show it to the patient dangling on the point of my instrument, and then she is, of course, surprised at its having been taken out without pain. You can do it in three or four minutes, now contrast this with the old way of making an arsenical application, allowing it to remain for three days, and then another visit by the patient with the possibility of a still further postponement. This method leaves the canal in a healthy condition, the other does not. I believe in nitrous oxide and somnoform for other operations in the mouth, but for cavity preparation and pulp removal, high pressure anesthesia is par excellence.

In answer to Dr. Ebersole, who was going to prove,—but didn't (Laughter)—that that pulp was not desensitized when he found no feeling in the part of the cavity farthest removed from the pit. That pulp was desensitized, notwithstanding. You cannot force cocaine into one side of the pulp and operate in a cavity on the opposite side without pain, unless that pulp is desensitized all over. I simply want to use cocaine enough to put that pulp asleep, and no more, and when I have done that, I know I haven't injured the pulp. I have found from my careful deductions that I know just about how long, probably within five counts, in any given case, before that cavity is desensitized. Sometimes we find curly dentine, and I have found cases where I worked for half an hour to force the solution thru. For a surgeon's young daughter I worked for an hour, and tried to enter the tooth in three or four places but failed. I told her father to bring her back another day, went in at another angle, and reached the pulp within two minutes. There were four broken down molars that had to be capped, for nothing else would do; the enamel had given out all over, and they must be desensitized in order to prepare them for caps; this I did painlessly for the girl. (Applause).

PROPOSED CLASSIFICATION OF FIXED BRIDGEWORK AND LAW GOVERNING ITS APPLICATION.*

By Alden J. Bush, D. D. S., Columbus, Ohio, Professor of Crown and Bridgework, Orthodontia and Metallurgy, Dental Department Ohio State University.

(Read before the National Dental Association at its Eighteenth Annual Meeting, Rochester, N. Y., July 7, 1914.)

IN ATTEMPTING to classify fixed bridgework I have endeavored, **first,** to broaden the foundation upon which the substructure of our present conceptions thereof rests, and to establish more thoroughly our comprehension of the principles and their application which constitutes the very substructure of the foundation itself; **second,** to systematize and facilitate the teaching of fixed bridgework in accordance with the accepted principles of practice which govern their employment; and **third,** to propose a law that embodies the principles which modern practice has approved, a law which will furnish a conservative plan for guidance in the selection of abutments adequate for the support and retention of fixed bridgework, and one which will likewise, impose limitations to the unprincipled employment of those types of construction which are from the standpoint of principle, indefensible.

The **terminology** used in the classification is simply a correlation of terms selected from our nomenclature, that constant usage has rendered familiar, and which have been selected because they seem to be the most expressive of any terms available.

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Most writers of dentistry, in referring to teeth of certain position in the arch, have used the terms anterior teeth and posterior teeth as best calculated to convey the idea of the association between object and position, likewise anterior and posterior have been used as the most expressive terms in referring to bridge replacements that supply a missing tooth, or group of teeth, in either of these locations.

Accordingly, then, fixed bridgework applied and confined within these limits may be divided into **anterior bridges** and **posterior bridges.**

Plate I.—In referring to Plate I illustrating possible fixed bridge replacements, it will be observed that the bridges represented as applicable to the various positions arrange themselves into well defined groups that are characterized by the teeth chosen for abutments in connection with the tooth or teeth supplied. Accordingly, therefore, anterior bridges may be sub-divided into a **central and lateral series,** and a **central and cuspid series:** likewise, posterior bridges may be subdivided into a **cuspid and third molar series,** and a **first bicuspid and second molar series.**

A single bridge of any one of the above

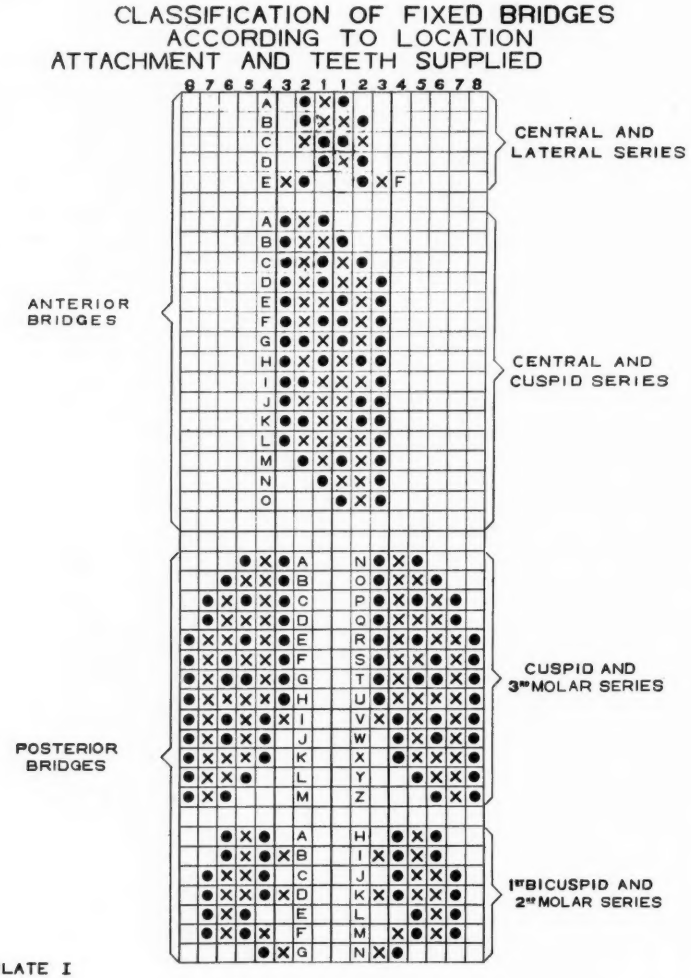

CLASSIFICATION OF FIXED BRIDGES
ACCORDING TO LOCATION
ATTACHMENT AND TEETH SUPPLIED
8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
CENTRAL AND LATERAL SERIES
ANTERIOR BRIDGES
CENTRAL AND CUSPID SERIES
CUSPID AND 3rd MOLAR SERIES
POSTERIOR BRIDGES
1st BICUSPID AND 2nd MOLAR SERIES

PLATE I

Showing series classification of simple bridges according to location, attachment and teeth supplies. The incompleted bridges "E" and "F" of the central and lateral series, also "G" and "N" of the First Bicuspid and Second Molar Series, when joined form simple bridges "EG" and "FN" and are classified as anterior bridges and enumerated as belonging to the central and cuspid series—both, however, retain their identity when used to form other combinations and are so enumerated as illustrated in charts 3, 4, 7, 8, 9, 10, 12, 13 and 14. The incompleted bridge "C" of the central and lateral series is not classified as a simple bridge, but when joined bilaterally to the simple bridge of the posterior series it assists in the formation of complex bridges and is so enumerated as illustrated in charts 9 and 10. Likewise, incompleted bridges "I" and "V" of the Cuspid and Third Molar series and "B," "D," "F" and "I," "K," "M" of the First Bicuspid and Second Molar Series are not classified as simple bridges, but when joined unilaterally and bilaterally to the simple bridges of the anterior series they assist in the formation of compound and complex bridges and are so enumerated as illustrated in charts 3, 4, 7, 8, 9, 10, 11, 12, 13 and 14.

series may be said to form a **simple bridge.**

Any bridge that can be effected by connecting **unilaterally,** any one of the simple bridges forming either of the anterior series, with any one of the simple bridges forming either of the posterior series may be said to form a **compound bridge.**

bridges; third, according to attachment and teeth supplied, anterior bridges may be subdivided into a central and lateral series and a central and cuspid series, and posterior bridges may be subdivided into a cuspid and third molar series, and a first bicuspid and second molar series; and fourth, the simple bridges of the an-

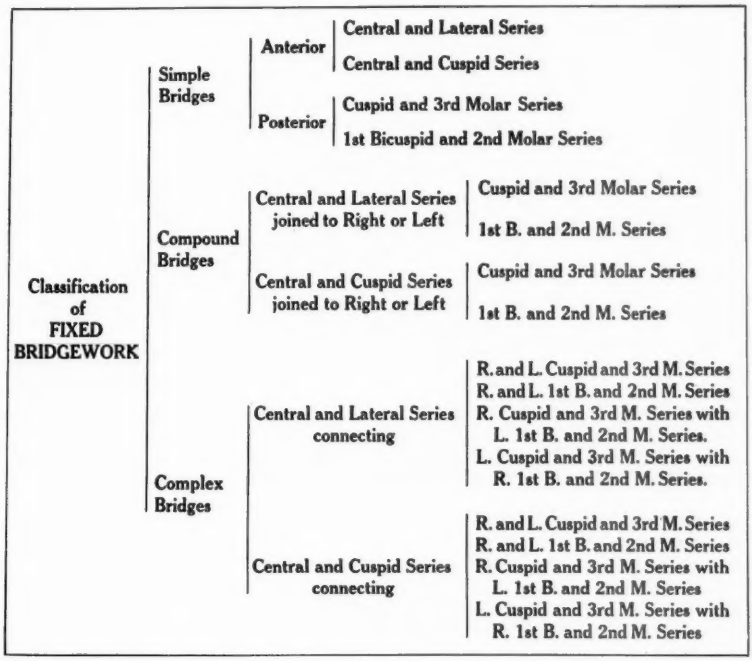

Classification of FIXED BRIDGEWORK
Simple Bridges
Anterior
Central and Lateral Series
Central and Cuspid Series
Posterior
Cuspid and 3rd Molar Series
1st Bicuspid and 2nd Molar Series
Compound Bridges
Central and Lateral Series joined to Right or Left
Cuspid and 3rd Molar Series
1st B. and 2nd M. Series
Central and Cuspid Series joined to Right or Left
Cuspid and 3rd Molar Series
1st B. and 2nd M. Series
Complex Bridges
Central and Lateral Series connecting
R. and L. Cuspid and 3rd M. Series
R. and L. 1st B. and 2nd M. Series
R. Cuspid and 3rd M. Series with L. 1st B. and 2nd M. Series.
L. Cuspid and 3rd M. Series with R. 1st B. and 2nd M. Series.
Central and Cuspid Series connecting
R. and L. Cuspid and 3rd M. Series
R. and L. 1st B. and 2nd M. Series
R. Cuspid and 3rd M. Series with L. 1st B. and 2nd M. Series
L. Cuspid and 3rd M. Series with R. 1st B. and 2nd M. Series

Plate II

Showing diagram of general classification of fixed bridgework.

Any bridge that can be effected by connecting **bilaterally,** any one of the simple bridges forming either of the anterior series, with any one of the simple bridges forming either of the posterior series, may be said to form a **complex bridge.**

Plate II.—To recapitulate, first, fixed bridgework may be divided according to extension, into simple, compound and complex bridges; second, according to location, into anterior and posterior

terior series when joined unilaterally and bilaterally to the simple bridges of the posterior series form compound and complex bridges respectively. The adjectives upper and lower, right and left are used as prefixes and complete the terminology.

Plate I.—Again referring to Plate I it will be noticed that all simple bridges of comparatively straight alignment have at least one support or attachment at each end, and furthermore, that all the simple

bridges of the various series, in being joined or connected to form compound and complex bridges form extended bridges of curved alignment with one or more intervening supports or attachments.

In view of this fact therefore, it seems fitting and much more in accord with the scientific phase of this class of work, that a general law be adopted that will furnish a safe plan for guidance and procedure in the application of the fixed bridgework in general, and which will serve the same purpose as the various rules that have been formulated from time to time to cover a comparatively small number of cases, more or less typical, all of which are fundamentally based upon the same principles.

The law proposed is as follows. **All fixed bridgework of straight alignment should be attached to, or supported by, one or more abutments at each end, and should receive additional attachment or support from one or more intervening abutments when of curved alignment.**

In accordance to the classification and law proposed, the following definitions are derived.

A **simple fixed bridge** may be **defined** as a bridge used to replace one or more teeth missing from the anterior or posterior positions of the arch, attached to or supported by one or more abutments at each end and are of comparatively straight alignment. Fig. 1.

A **compound fixed bridge** may be defined as an extended bridge effected by a simple anterior bridge joined **unilaterally** to a simple posterior bridge to supply two or more missing teeth from the anterior and posterior portions of the arch, attached to or supported by one or more abutments at each end and one or more additional attachments or supports from one or more intervening abutments and are of curved alignment. Fig. 2.

A **complex fixed bridge** may be defined as an extended bridge effected by connecting a simple anterior bridge bilaterally with a simple posterior bridge to supply four or more missing teeth in the arch and are attached to or supported by one or more abutments at each end and one or more additional attachment or supports from one or more intervening abutments and are of curved alignment. Fig. 3.

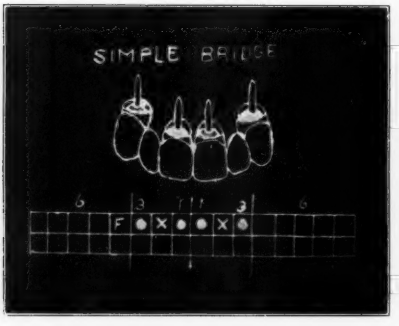


Fig. 1

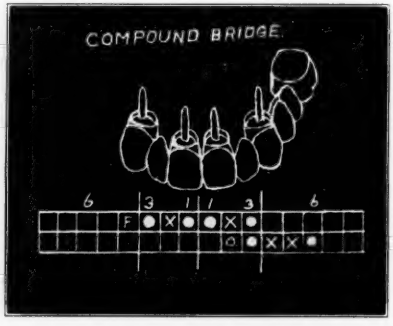


Fig. 2

In support of the proposed classification and in defense of the law which embodies the principles upon which the classification is largely based I wish to quote the following taken from a former paper.

"If the muscles of mastication are capable of exerting a stress of 275 pounds upon the first molars and if the supporting tissues of the first molars have been

capable of developing a structure which will safely bear such a strain, it must be concluded that the development of the muscle and the supporting tissues of the teeth are co-incident and in accordance with physiological laws.

"It is also true that this muscular power is normally intended to be exerted within physiological directions, and that the supporting tissues of the teeth are developed and physiologically designed to receive and support this strain only when this muscular stress is transmitted to them in a normal direction and according to physiological principles.

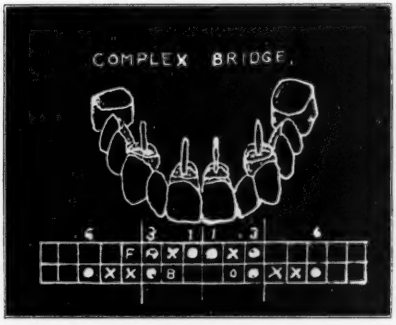


Fig. 3

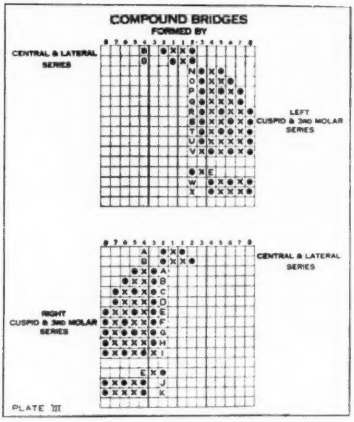
"The wonderful power that the muscles of mastication are capable of exerting, and the wonderful plan upon which Nature has constructed the human teeth in order to utilize this energy in the mastication of food, and the wonderful design of the tissues which support the teeth while performing these functions, all seem to be in perfect accord with the marvelous schemes of Nature. Yet, it must be remembered that this muscular energy is intended to be exerted only within certain limitations, bound by the normal, and the design of the teeth render them efficacious in performing their functions only when muscular energy propels them normally, and that the tissues which support the teeth while performing their functions are capable of yielding normal support only when the muscular stress of mastication is normally directed.

"Therefore, it would not be in accordance with physiological laws to expect a first molar which, if normally capable of withstanding a stress of 275 pounds, and the supporting tissues normally capable of resisting the stress, to physiologically resist this stress if the direction of the stress be perverted, and the supporting tissues compelled to receive the stress contrary to the direction that they are normally designed to receive it.

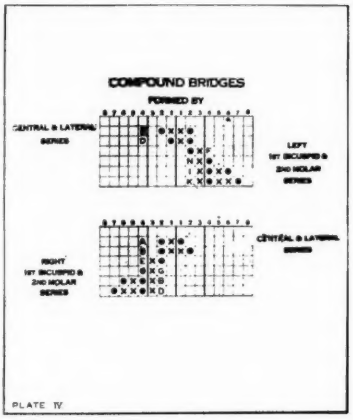
"Hence, it seems obvious that if fixed bridgework be constructed with occlusal and incisal masticating surfaces after Nature's plan and in accordance with physiological law governing normal articulation and occlusion, and if the stress as received by the abutments is normally directed, that such bridgework may be successfully attached to the roots of teeth without inviting pathological manifestations."

But, on the other hand, **if fixed bridgework be constructed without due regard for these principles, and the occlusal or incisal surface be so made, as to abnormally direct the resultant force to the abutment teeth, OR THE EMPLOYMENT OF ABUTMENTS BE SUCH AS TO SUBJECT THEM TO STRESS PERVERTED THROUGH LEVERAGE, then will the supporting tissues surrounding the root fail to render support, just in proportion as the stress is perverted and the supporting tissues are obliged to offer resistance in a direction which they were never intended to furnish.**

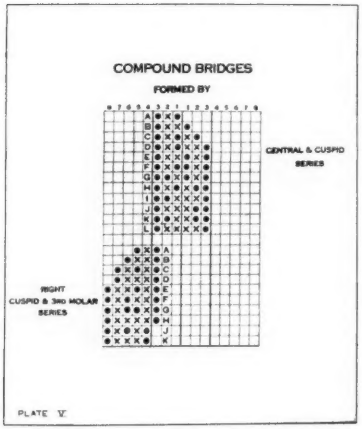
Unquestionably, there are many fixed bridges outside the scope of this proposed law and classification which are apparently giving good service, and which, by reason of this apparent service, and their continued employment, have thus, seemingly, been sanctioned as good practice: nevertheless, the soundness of the principles underlying the proposed law cannot be questioned, neither can it be denied that these same bridges in ques-



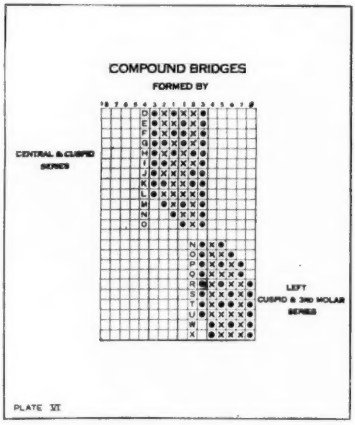
Showing compound bridges formed by central and lateral series joined unilaterally to Left Cuspid and Third Molar Series, also Central and Lateral Series joined unilaterally to Right Cuspid and Third Molar Series.


COMPOUND BRIDGES
FORMED BY
CENTRAL & LATERAL SERIES
LEFT 1ST BICUSPID & 2ND MOLAR SERIES
RIGHT 1ST BICUSPID & 2ND MOLAR SERIES
CENTRAL & LATERAL SERIES
PLATE IV

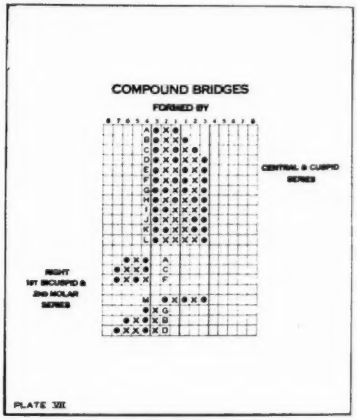
Showing compound bridges formed by Central and Lateral Series joined unilaterally with Left First Bicuspid and Second Molar Series, also Central and Lateral Series joined unilaterally to Right First Bicuspid and Second Molar Series.



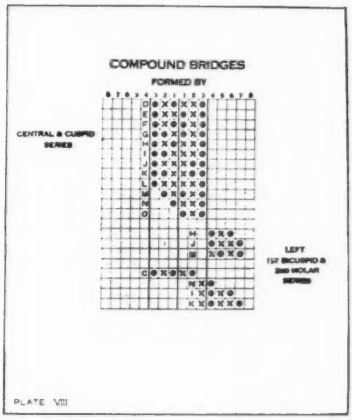
Showing compound bridges formed by Central and Cuspid series joined unilaterally to right Cuspid and Third Molar Series.



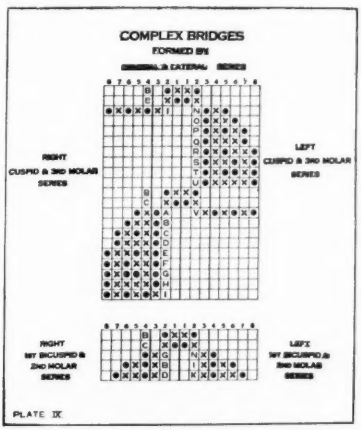
Showing compound bridges formed by Central and Cuspid Series joined unilaterally to left Cuspid and Third Molar Series.



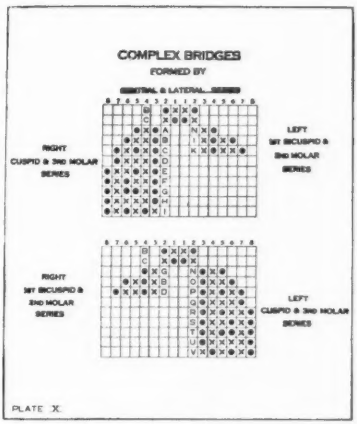
Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Right First Bicuspid and Second Molar Series.



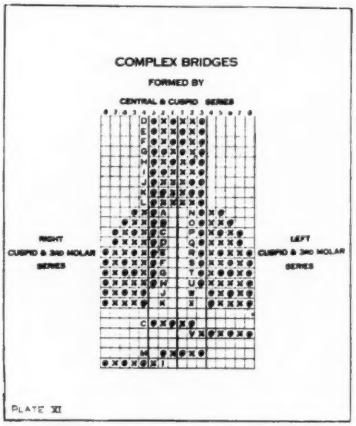
Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Left First Bicuspid and Second Molar Series.


COMPLEX BRIDGES
FORMED BY
RIGHT CUSPID & 3RD MOLAR SERIES
LEFT CUSPID & 3RD MOLAR SERIES
RIGHT 1ST BICUSPID & 2ND MOLAR SERIES
LEFT 1ST BICUSPID & 2ND MOLAR SERIES
PLATE IX

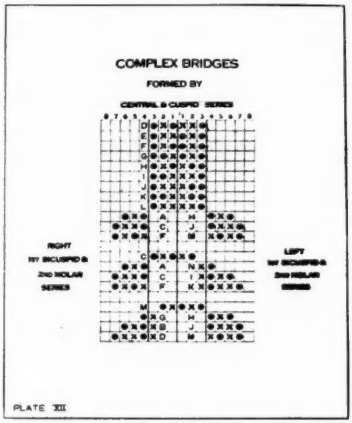
Showing complex bridges formed by Central and Lateral Series joined bilaterally to Right and Left Cuspid and Third Molar Series, also complex bridge formed by Central and Lateral Series joined bilaterally to Right and Left Bicuspid Series.


COMPLEX BRIDGES
FORMED BY
RIGHT CUSPID & 3RD MOLAR SERIES
LEFT 1ST BICUSPID & 2ND MOLAR SERIES
RIGHT 1ST BICUSPID & 2ND MOLAR SERIES
LEFT CUSPID & 3RD MOLAR SERIES
PLATE X

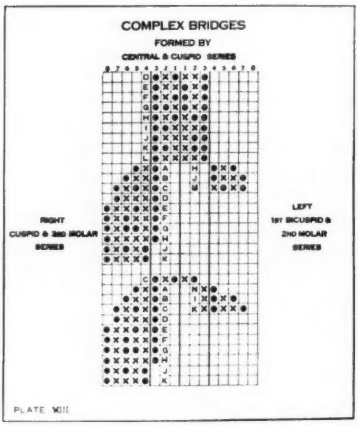
Showing complex bridges formed by Central and Lateral Series joined bilaterally to Right Cuspid and Third Molar Series and Left First Bicuspid and Second Molar Series. Also complex bridges formed by Central and Lateral Series joined bilaterally to Left Cuspid and Third Molar Series and Right First Bicuspid and Second Molar Series.



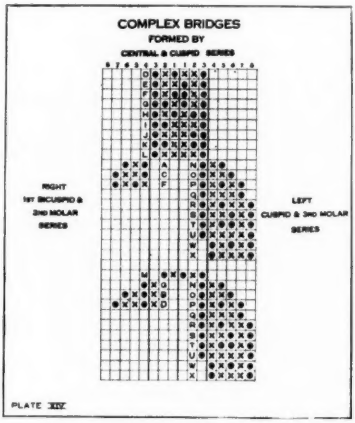
Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right and Left Cuspid and Third Molar Series.



Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right and Left First Bicuspid and Second Molar Series.



Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right Cuspid and Third Molar Series and Left First Bicuspid and Second Molar Series.



Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Left Cuspid and Third Molar Series and Right First Bicuspid and Second Molar Series.

tion might have rendered a still greater service had they been effected more strictly in accordance with the principles involved.

of incalculable benefit to teachers especially: yet, I offer the results of my efforts in this direction with full knowledge of the imperfections that generally

TOTAL NUMBER OF FIXED BRIDGES, UPPER & LOWER, ACCORDING TO SERIES CLASSIFICATION AND LAW GOVERNING THEIR APPLICATION.

SIMPLE BRIDGES

Central and Lateral Series	6	
Central and Cuspid Series	34	
Cuspid and Third Molar Series	48	
1st Bicuspid and 2nd Molar Series	12	
		100

COMPOUND BRIDGES

Central and Lateral Series joined to Cuspid and 3rd Molar Series	80	
Central and Lateral Series joined to 1st Bicuspid and Second Molar Series	36	
Central and Cuspid Series joined to Cuspid and 3rd Molar Series	480	
Central and Cuspid Series joined to 1st Bicuspid and 2nd Molar Series	156	
		752

COMPLEX BRIDGES

Central and Lateral Series connecting Right and Left Cuspid and 3rd Molar Series	68	
Central and Lateral Series connecting Right and Left First Bicuspid and 2nd Molar Series	36	
Central and Lateral Series connecting Right Cuspid and 3rd Molar Series with Left 1st Bicuspid and 2nd Molar Series	108	
Central and Lateral Series connecting Left Cuspid and 3rd Molar Series with Right 1st Bicuspid and 2nd Molar Series	108	
Central and Cuspid Series connecting Right and Left Cuspid and 3rd Molar Series	1840	
Central and Cuspid Series connecting Right and Left 1st Bicuspid and 2nd Molar Series	198	
Central and Cuspid Series connecting Right Cuspid and 3rd Molar Series with Left 1st Bicuspid and 2nd Molar Series	600	
Central and Cuspid Series connecting Left Cuspid and 3rd Series with Right 1st Bicuspid and 2nd Molar Series	600	
		3558
Total number of combination		4410

Plate XV

Showing the total number of fixed bridges, upper and lower, according to proposed classification and law governing their application.

While I am confident that a competent classification of fixed bridgework will broaden our comprehension of the principles underlying its employment and be attend human effort, no matter how perfect they seem to their author, in the hope that enough good will be found therein to merit your consideration.

Discussions.

Dr. Thomas P. Hinman, Atlanta, Ga.

The essayist has done wonderful work along the line of classification. It of course especially interests the teachers, and it should interest the profession. I believe in the general principles he has enunciated and the law he has laid down as the basis and foundation for fixt bridgework. It defines very clearly, to my mind, the line where fixt bridgework stops and removable begins. This may not meet entirely with the approval of those who have made up their minds to practise entirely removable bridgework, but the principles explained and combinations shown are of such a character as to make this work invaluable, not only to teachers, but to individual practitioners.

Where there is no posterior attachment, and only an anterior attachment, we have seen failure after failure, and we should feel encouraged that some one has taken up this principle of classification. He has shown us the safety line, and just how far we can go in our fixt bridgework. If you will take these charts and study them carefully, you will find what a large amount of work was necessary to do this and how carefully the Essayist has worked out the principles involved. We cannot discuss this paper to a great extent, but simply in a general way. I wish to thank the Doctor for bringing it before us, and am sorry I cannot say more in commendation of it. (Applause).

Dr. Wm. O. Hulick, Cincinnati, Ohio.

Continuing the discussion of this valuable paper, it will be well for me to make a statement which is apart from the subject somewhat, in order to more forcibly comment on the many good points set forth by the essayist.

Observations have lead me to look upon bridge replacements with suspicion and apprehension, at least as practised by a too large percentage of dentists at the present time. It is my honest belief, however, that bridge replacements are necessary and will be employed even to the end of time.

It is likewise my belief, that we are in great need of radical reforms in its application both as to classification and technic so as to overcome many objectionable features. To that end many writers have directed their attention, and great progress has been made. Indeed, it would seem at this time, that greater progress has been, "from a scientific standpoint, than in the practical application."

These remarks are, perhaps, apropos at this time. However, you will also pardon, I know, the statement that up to this time writers and clinitions have failed to impress, or arouse the profession to the importance of some of the fundamental principles involved in fixt bridge work. It was with this thought of improvement in mind that Dr. Bush has given us today a positive and practical system of classification and application of the laws governing fixt bridge work which if observed carefully will undoubtedly overcome many objectionable features heretofore encountered.

His enthusiasm and earnestness of purpose in the presentation of this subject and others recently, should be an inspiration to all of us to give his methods fair and imparital consideration. His classification, **simple, compound** and **complex bridge-work** is well put, scientific, practical and a careful study of plates I and II will greatly assist us in equalizing force by combining the different series unilaterally and bilaterally.

I quite agree with the essayist in his proposed law, "all fixt bridge-work of straight alignment should be attached to, or supported by, one or more abutments at each end, and should receive additional attachment or support from one or more intervening abutments when on curved lines."

This statement would, in a way, contradict the simple bridge replacement,

Plate I, of the cuspid and third molar series, unless connected unilaterally with one of the anterior series.

In support of this statement, I wish to call your attention to the natural and physiological law.

In the creation of the human body, all parts were expected to do its respective functions, normally, naturally, until senility; therefore, each tooth was intended to do its work and no more.

Again quoting from the essayist: "If the muscles of mastication are capable of exerting a stress of 275 lbs. upon the first molars and if the supporting tissues of the first molars have been capable of developing a structive, which will safely bear such a stress, it must be concluded that development of the muscles and the supporting tissues of the teeth are coincident and in accordance with physiological laws."

I grant the above statement to be true of the teeth in their natural environment. However, when any of the posterior series are employed, especially the third molar and cuspid series, even when on straight alignment, the supports are required to bear more force and pressure than nature intended, even tho the bridgework be constructed with masticating surfaces, after nature's plan, and in accordance with the physiological laws governing articulation and acclusion.

It has been stated by some authorities, that by uniting two or more teeth to bridge replacements, the movement of each is so modified and restrained as to enable them to successfully withstand more force than the sum total of their resistance. I do not believe that nature will strengthen teeth so engaged to accommodate our methods of misapplied force that is unnatural and unreasonable in their demands for proper mastication, even if the stress as received by the abutments is normally directed.

The force of the bite, or the pound's pressure with which the jaw may be closed upon an object, in a perfectly normal or natural condition, as stated by the essayist, is 275 lbs., over the molars, which varies greatly with individuals, and especially, is it true where bridgework is employed, even according to prescribed methods of procedure; so that the force of the bite will be modified from time to time, pounds pressure becoming less and less, thereby inviting and causing pathological disturbances.

I do not wish to comment further, except to compliment the essayist for the very able and scientific presentation of a subject we should all look more seriously into.

DR. GILLETT, New York.

While acknowledging the enthusiasm and earnestness of the Essayist, I want to voice my feeting that it is a misplaced earnestness and enthusiasm. I regard the day of fixt bridgework as having past, and I believe the next decade will see the end of its use. It is time the colleges of the country stopt teaching it, because it has been most thoroly discredited. The time has past when fixt bridgework should be used for cases of more than one tooth, and then only in carefully selected conditions. I say that dogmatically. I believe it is so true that there can be no exception to it. I believe it is not possible for our patients to keep their mouths in a clean condition with fixt bridgework, regardless of whether it be called physiological or any other name. (Applause).

DR. HERMAN E. S. CHAYES, New York.

I differ with the Essayist, and I am sorry, because I know that his earnestness is absolutely unquestioned. But I must state that I believe that the definitions in these classifications are entirely incorrect.

I want to call attention to the so-called simple bridges and to the definition given us. It will have to be accepted sooner or later by those who teach bridgework according to physiological and physical laws, that a simple bridge

is one in which the abutments and the dummies are subjected to the same physical stress, that is a physical stress exercised in the same direction. (Example). Supplying a second upper or lower molar, using the third and first molars as abutments.

A compound bridge is one in which the artificial substitute, by virtue of its position and acquired occlusal relation, is subject to a stress different from that which works upon the abutments. Example: Supplying a lateral incisor upper or lower, using the cuspid and central as abutments; or supplying a second lower bicuspid, using the first molar and first bicuspid as abutments.

A complex bridge is one in which the artificial substitutes are subjected to a stress wholly foreign to the stress of the abutments, and where the abutments are situated upon opposite sides of the arch. Example: Supplying four anterior teeth, using the cuspids as abutments, or supplying the four incisors and the four bicuspids and first molars, using the cuspids and second molars as abutments or piers.

That, according to mathematics and physics and according to the bridge-building would be the correct definitions of simple, compound and complex bridgework.

To these must be added the cantilever bridge, which is one attached to natural abutments at one end only, and depends upon the resilient mucosa for its major support. Combinations of complex and cantilever bridges may exist, such as cases presenting anterior abutments upon both sides of the arch and posterior abutments on one side only.

Now let us for a moment see where the essayist has brought us to. We are today in the throes of change. All of us are dissatisfied with the results of fixt bridgework. The best thought in the country and in the dental profession, during its history, has been applied to the solution of the problem of getting away from fixt bridgework. And why? All of us know that every bit of living organism is in a state of constant motion. There isn't an atom in our body that is in a state of complete rest. Every molecule is in a state of constant rythmic motion, which motion is in definite relation to the motion of the molecules neighboring it, which warrants the conclusion that the molecules influence one another to the point of causing corresponding geometric gyrations or movements in each other. How inconsistant with this law must be the fixation of any two, three or four teeth by a denture fixt in the mouth! There isn't a bit of tissue in your body, in any organ, that isn't subject to constant motion, and that does not need this exercise to replenish it with vitality and nutriment to re-stimulate it which comes only from that exercise. And when you fix two teeth in the human mouth and cause them to carry two more artificial teeth, and when you put them in the jaw and rob them and the surrounding structure of the motion it is intended they should have, during mastication, you cause retroactive changes in their structure which makes it impossible to have a condition of perfect physiological balance.

I speak with vehemence on this, because I have devoted years to the elimination of that fixation problem, and I thought we had come to the point where the schools of the country recognized that normal exercise of every tissue is what is needed by that tissue, and that we haven't a right to rob it of that.

What would happen to your arm if you tied it up in a sling? It would atrophy. When you exercise a tooth in mastication, the stress is distributed to the structures surrounding the tooth by way of its peridental membrane, in a series of motion waves, until a complete physical change of these structures has taken place. When you remove the mastica-

tory stress, there is a return to normal, providing your teeth are not immovably fixt to one another, and your surrounding structures are unhampered by tooth fixation.

But if you enjoin these teeth, by putting a fixt artificial denture upon them, then you rob the surrounding structure of its motion wave, and the thing you accomplish is the elimination of the possibility of the action of these tissues. You get an inhibition of the restimulating mobility of these tissues, and you get an atrophy. I thank you. (Applause).

DR. BUSH: I want to thank those who have taken part in this discussion. My object in giving you this classification of fixt bridgework was to classify something that we are doing in every day work. I care nothing about entering into a discussion of the advisability of the employment of this class of work, neither do I care to say anything as to the indications or contra-indications governing the use of bridgework. Those who wish to discard fixt bridgework may do so, but I do not consider my efforts in attempting its classification as entirely lost. It is very gratifying to me to know that this work is appreciated by those who I was most hopeful would appreciate it. I wish to thank you again very much. (Applause).

PYORRHEA ALVEOLARIS.

COMMENTS UPON THE VACCINE TREATMENT.

By John Deans Patterson, D. D. S., Kansas City, Mo.

(Read before the National Dental Association at its Eighteenth Annual Meeting, Rochester, N. Y., July 8, 1914.)

THE first thought that came to the writer when an invitation came from the chairman of the section to write upon this subject for this meeting, was that nothing new can be said about Pyorrhea and that "repetition is useless." Yet a growing interest upon the part of the public regarding this condition and the possibilities for relief demand that our attention to the matter be not abated and especially regarding so-called new methods of controlling the conditions, for condition it is and not a disease **Per Se.**

The new methods referred to relate especially to the vaccine treatment and embrace inoculations to raise the opsonic index. In some parts of our country this new fad has spread like wildfire and there is at least one bacteriologist who will mail to any dentist an autogenous vaccine if pus samples are furnished according to directions. So that any country dentist can treat his patients at home. When we consider the care demanded before inoculation, thru physical examination, urine analysis, fecal examination, blood tests, etc., before inoculation is practised, it is hardly possible that this would be carefully done in the "mail order way."

The practise has become so frequent that one asks—why? The most intelligent of the specialists who rely upon vaccines claim only an aid to local instrumentation and local remedies, and while acknowledging that irritants must be mechanically removed, claim that recurrence of Pyorrhea is prevented by the inoculation.

The writer has in the last thirty-five years observed hundreds of cases of Pyorrhea and in many patients there has been a recurrence after relief had been given—but in not a single case was the return due to anything **but a new deposit** of calcic matter or other evident local irritation due to a lack of oral care.

If then the vaccine advocates acknowledge that mechanical irritants are the chief causes of the condition—and also declare that these must be removed surgically—how is recurrence to be prevented without again using local means? Do they acknowledge that the condition originates from irritants? Yes—I quote from Dr. Medalia, page 705, **Cosmos,** 1913, "As to the causes of this disease I found that the mechanical causes are by far the most important ones in starting the disease while the local infective causes I found more important in keeping it up." "Among the local mechanical causes," he continues, "tartar deposits and calculi are the most important." Now if the disease does not start without me-

chanical irritants, and when once relieved from inflammation, pain and effusions, recurs again, does not local, irritation again supervene? And how pray does inoculation prevent the precipitation of calcic matter? It has been claimed that vaccines do away with the over saturation of the blood and lymph with calcic matter—but Adami has clearly proved that theory is incorrect.

He says, "We never find the blood so full of calcium salts that these become deposited within the vessels." "In all cases the amount of calcareous salts in the blood is far below the point of saturation." "What stands out very prominently is that in a majority of cases a deposit of these salts occurs in dead tis sue, or in the inanimate intercellular parts of living tissue."

"Thus it follows that for calcification to occur it is necessary that lime salts be brought to the parts. This can only be done by the agency of the blood, or more exactly the lymph. We know that both of these fluids contain calcium salts in solution, and as the lymph diffuses into the parts, chemical processes ensue such that the contained salts become converted into insoluble salts, and are precipitated **in Situ."**

From this quotation it will be seen that to claim the return of Pyorrhea would be prevented because the vaccines clean the blood and lymph of an unusual amount of calcic contents, is untenable, and raise the opsonic index would not prevent precipitation of calcic matter if a proper nidus were established by a lesion for such precipitation. Dr. Gompertz, another advocate of vaccines, endeavors to prove the efficiency of the vaccine treatment; but under the head of

ADJUVANT LOCAL TREATMENT

says (p 813) Cosmos, 1913.

"I might mention that appropriate local treatment should also be employed in conjunction with the vaccine **and I believe that the more thoro this treatment the more permanent the results."**

Does this not look like a **"Confession and Avoidance"** as the lawyers would say? It certainly says to the writer that the more careless the treatment the more demand there is for inoculation and that a still more "thoro" local attention might nullify the plea or necessity for vaccines entirely.

We hear frequently writers and speakers upon the subject declare that local surgical treatment did not avail and results only came after the use of vaccines.

(Dr. Gompertz, says **Cosmos**, 1913, p 811): "That Pyorrhea Alveolaris does not respond to conventional treatment can not be disputed."

(Dr. Beebe, Cosmos, 1913, p 481), "Most of the patients seen by the writer were referred by good dentists being cases they were **unable to benefit."**

At the last Kansas Meeting a paper upon the "vaccine treatment" related several cases when surgical treatment failed and immediate relief ensued with vaccine.

It seems strange does it not? That cases where "conventional treatment" fails are invariably found in the hands of the pro-vaccinationist.

Scores of operators all over the country will testify as does the writer, that intelligent and persistent local treatment completed, will **never fail** to show satisfactory results.

Then why the discrepancy in clinical testimony? Is it climatic? Is it racial? Is it argumentative? Or is it on the account of the **"Personal Equation?"** Or the vagaries of an **Abnormal Psychology?**

Each can draw his individual conclusion. This should be done without prejudice and without bias remembering that **"He who knows only one side of a question knows neither."**

It has been said there is no danger, no risk in the vaccines treatment.

Such remarks, it will usually be found, come from the uninformed, for the bare

statement that the implantation of disease elements into the bodily tissue be they ever so attenuated, cannot be done without danger, **"it is subversive of the fundamental principles of sanitary science,"** and history proves its danger by long lists of infections and deaths from vaccination.

Risks, however, must and should be taken to preserve human life, and if, in the treatment of a malady a specific micro-organism or Bacillus is known, then measures to render that pathogenic entity inert are taken, and the scientific world approves. In the treatment of Pyorrhea Alveolaris we are not dealing with a condition that **per se** endangers life, then why subject our patients to the risk of infection from the dead bacteria from the pneumococci, the streptocci, the staphylococci and the M. Catarrhalis which furnish the injections in either autogenous or stock preparations which are usually employed.

It would be an unnecessary task in this paper to place before this assembly the long clinical history of the dangers of vaccination. The record is in literature and can be easily obtained.

"Vaccination will undoubtedly rank as the greatest and most pernicious failure of the century. This conclusion is no longer a matter of opinion but of science."—So says Alfred Russel Wallace, co-discoverer with Darwin of the law of Evolution and universally regarded as one of the leading scientists of the day.

I will place before you the record of a few cases from the writer's practise and from conferers who are members of a small club of dental progressives in Kansas City and who have kindly volunteered to give record of cases where good or bad results followed the vaccine treatment.

FIRST CASE.

(In my own practise.)

"Mr. L.—, age 20, presented to me the early part of 1913 with the worst case of lip, tongue, and cheek ulceration from Pyorrhea I had seen—the face and lips gave every expression of Cheilitis."

History by physician: "Young L— has been treated by me and previously by two other specialists by making blood tests and by vaccines to raise opsonic index, with little or no result—I noticed gums were bad and have sent him to you." After five treatments taking a few teeth at a time ulcerations on lips and tongue which were always at a point where advanced Pyorrhea Pockets were present, disappeared—later the pimples upon the face healed and now, one year later the cure continues.

Indifferent scaling had been performed prior to the Serum treatment. My treatment was entirely local.

I have received the following letter from his father:

June 3, 1914.

Dr. J. D. Patterson.

Dear Doctor:—I take pleasure in stating that your treatment of my son, greatly benefited his teeth and gums. As a matter of fact prior treatment by specialists did not benefit him. This word of indorsement is made in justice to you.

(Signed)

SECOND CASE.

(Reported by Samuel Lobenstein, D. D. S.)

Mrs. B, age 45 years, nurse, several teeth, upper and lower, affected. Rheumatism, physical condition below par. Pyorrhea Alveolaris quite well marked, recession of gums considerable.

Patient inoculated with autogenous vaccine, micro-organisms present mostly staphyloccus and Streptoccus. No mechanical or medical treatment of the teeth and surrounding tissues until after three or four inoculations. Pus began to diminish in quantity and intensity at once. Pyorrhea cured and patient dismist at the end of four or five weeks physical condition improved greatly, rheumatic pains have entirely subsided.

2nd. Case of Mrs. B., age about 38.

She described case as follows: "I have taken the vaccine treatment for a year, and my gums are growing worse, so I have stopt the vaccines. At first the injections were made twice a week and after that once a week, resting a month about the middle of the year."

"The injections were made on back of neck and it was made sore and stiff all the time until I was afraid of permanent injury and abandoned the treatment."

I found Sup molars with deep pockets and discharging pus copiously. Local treatment gave complete relief in one week.

THIRD CASE.

(Related by Mrs. B.)

My neighbor, Mrs. S, became discouraged with local treatment and on account of the pain for Pyorrhea and took the vaccine treatment from a specialist who also scaled the teeth.

After the second treatment her lips and face broke out in blotches and the upper arm where the injections were made became hard and sore. She continued the treatment, however, the operator saying, "that the response would come sooner or later." Gums became no better and treatment was dropt.

FOURTH CASE.

(Mrs. F., age about 46 years.)

Upper molars and right upper central incisor affected with Pyorrhea Alveolaris to a very considerable extent. Right central incisor splinted to right lateral incisor.

Micro-organisms found mostly Staphyloccus and Streptoccus.

No mechanical or medicinal treatments until after several inoculations of autogenous vaccine. Improvement marked at the end of two to three weeks after patient had had three or four inoculations. Patient continued to improve and was discharged at the end of about three months, very markedly benefited.

FIFTH CASE.

(Reported by Dr. Lobenstein.)

(Mr. T. age about 38 years.)

Decided Pyorrhea Alveolaris. Patient heavy cigar smoker, teeth decidedly unclean and neglected, several poorly fitted gold crowns and one one-tooth bridge, producing severe irritation.

Crowns removed, teeth properly cleaned, less smoking indulged in and patient inoculated with P. D. & Co.'s mixt injection, "Phylacogen." Six to eight inoculations over a period of some six weeks. At the end of this time the mouth of the patient was in excellent condition and the tissues were normal. Recession of gums well marked. But gums normal color and density. Physical condition much improved.

Case A.—Lady, age 65. Toxin made from Pyorrhea pockets, some six or eight injections used, reaction not severe, patient decided she was getting no satisfactory results and refused further treatment, so far as I could tell there was practically no improvement in her case.

Case B.—Son, age about 45. Taken same time, who claims he was cured and spoke very highly of the treatment, came to have his teeth cleaned, found Pyorrhea pockets, same as before treatment, inflammation somewhat reduced but in very short time returned with Pyorrhea abscesses which had to be opened, last I saw of this patient still had a very bad case of Pyorrhea.

Case C.—Merchant about 60 years old took toxin injections made from various pockets, had normal or should say usual reaction, however, his whole system was in a very bad condition, skin of very decidedly jaundiced appearance. Results were absolutely negative. Resulting in extraction of all his teeth within the year following.

Case D.—Banker was treated with mixt infection Bacterial vaccine, a stock solution of a prominent chemical

company, this case I had more direct contact with during treatment than any of the above, the injections were made in the back, every other day, there was a slight chill, followed by slight temperature, about six hours after injections, lasting a few hours only, some 15 or 18 injections made, at no time did the Pyorrhea condition improve; on the contrary the edges of his gums about the teeth seemed more irritated and sore than before treatment was started, and finally decided that he would go back to old method of treatment, health was much improved by the vaccine treatment, this much is beyond dispute, but no improvement in the Pyorrhea was noted at all.

You will notice I have had no real cures under my observation, on the other hand have had reports of some wonderful cures of Pyorrhea, but so far it has not been my fortune to see them.

(Signed)

R. M. SEIBEL, D. D. S.

CONCLUSIONS.

If **Pyorrhea Alveolaris** can be permanently relieved by intelligent painstaking and persistent attention to instrumentation local therapeutic and subsequent scrupulous determination on the patients part to divorce the teeth and their surrounding tissues from any form of local irritation or infection—(and the writer asserts that possible) then the vaccine treatment whether by autogenous or stock preparation is unnecessary and unscientific.

If faulty metabolism is present in a patient, or systemic complication exists which invites the infection of tissue by micro-organic life processes and thus defeats the efforts of nature to remove obstacles—then those systemic conditions should be at once corrected—but in the case of the treatment of Pyorrhea—**not** by vaccines—but chiefly in **nature's simplest remedies of food and plant, fresh air, exercise, deep breathing, refreshing sleep,** absence of consuming care and worry.

When will man get to know that nature's eliminatives are the only dependable ones, and that drugs are only for emergencies.

Discussions.

T. Sydney Smith, Palo Alto, Cali.

I am deeply interested in the subject which Dr. Patterson has presented to us, and I think he has made a wise choice in selecting the vaccine subject at this time.

His paper shows that he has given this matter much careful thought, and I agree with him in the main regarding the use of vaccine therapy in the treatment of pyorrheal conditions; but I must take exception to his opening statement "that nothing new can be said about pyorrhea."

As a matter of fact, most of the things which have placed the treatment of pyorrhea on an accurate and scientific basis are very new, so new, that we are only beginning to realize the importance of them.

Dr. Patterson has pointed out that even the most extreme advocates of vaccines for the treatment of pyorrheal conditions all admit that they merely assist the local surgical treatment in bringing about the cure. I believe that a better understanding as to the exact part they play in this treatment will help us all to use them more conservatively, if we resort to them at all.

We must remember that upon examining a pyorrheal pocket we find that a cleavage has occurred between the supporting structures and the root, thus forming a pocket which contains a number of distinct strains of micro-organisms existing symbiotically with each other. On the root side of this lesion we find the denuded cermentum, either coated with quantities of precipitated calcium salts, or presenting a pitted surface filled with the dead terminal ends of the per-

icemental fibres, and innumerable quantities of bacteria. It can readily be seen that nothing short of securing a vital reattachment between the separated soft tissues and the cementum, which has this unfavorable surface, can in any sense of the word be accepted as a cure. It can also be seen, that if it were possible to increase the bactericidal action of the tissues by stimulating them with vaccine until the last trace of bacterial life would have been destroyed, we would not have changed the surface of the cementum in any marked degree. We certainly would not have the condition which is absolutely necessary to permit a re-union to take place. What is required is the surgical removal, not only of all the calcarious deposits, but also of the dead pitted surface, using extreme care not to cut deep enough to expose the lacunae and canuliculi in the deeper portions of the cementum. Having accomplished this, all of the freshly exposed tissues including the blood, must not be disturbed by introducing even a normal salt solution into the wound. They must be left in undisturbed contact for a sufficient time for Nature to heal and unite them.

The question naturally arises, what becomes of the remnant of micro-organisms which our surgical treatment must leave in the wound, and would not the use of vaccines be of great assistance in destroying them?

For answer I will say that we are dealing with chronic infections, and I believe, in spite of repeated statements to the contrary, that the continued presence of these organisms, where they are constantly surrounded by unhealed tissues and broken blood vessels, has forced the blood and fixt cells to fortify themselves with antibodies, to meet not only all of the invading organisms, but even their specific degree of virulence. The rapid and perfect healing which follows our surgical treatment is proof of this.

Again—bacteriological tests frequently show the presence of pathogenic organisms in these pockets, having a degree of virulence which would cause a dangerous infection if introduced into the tissues of one who had not previously been their host. Yet experience shows that no increased infection follows in these cases, when they are carried into the deeper tissues by our surgical instruments.

I admit that a greater production of antibodies might be produced by stimulating the tissues with autogenous vaccines; but I ask—is it rational or scientific to do so, until we have first tried perfect surgical treatment?

If we employ vaccines at all, I believe that they should be autogenous in order that they may produce antibodies which are exactly suited to the degree of virulence of the various strains of bacteria found in any given case.

In my discussion of Dr. Medalia's paper, published in the Cosmos, February, 1913, I called particular attention to the absolute specificity existing between an antibody and its antigen. I believe, however, that we cannot produce a perfect autogenous vaccine at the present time from pyorrheal lesions, owing to the difficulty of including anaerobic strains. Since perfect surgery will cure pyorrhea without the aid of vaccines, if the teeth are vital, it is difficult to tell how much benefit is derived from adding them.

Dr. Patterson has quoted from Alfred Russell Wallace, who says:

"Vaccines will undoubtedly rank as the greatest and most pernicious failure of the century."

I believe this is too extreme a view to take, as the results which have followed the use of antatiphoid vaccine proves: but we certainly must be on our guard not to be caught by the wiley advertising schemes of the manufacturers. We must not be duped in this case as we were with their antiseptic remedies.

I wish to call special attention to the unreliable nature of the reports, which

are being given from time to time, by the men who advocate the use of vaccines. They speak of the teeth in each mouth collectively, and assert that they have cured so many patients, but do not go into detail as to the exact condition of each tooth, before and after the treatment.

Men with experience know that the separated tissues cannot be re-attached to pulpless pyorrheal roots. We also find some multi-rooted teeth, with such narrow bifurcations that we cannot prepare them correctly without surgical instruments. The best we can possibly do in these cases is to give paliative treatment. Therefore, we may cure some teeth, and simply relieve others in the same mouth. These men have made no mention of these conditions in their reports of cured cases.

I believe exact measurements should be taken of each tooth at the time they are operated on, and a record kept of the pulpless ones. The record should show the number of millimeters from the incisal edge to the septal points, the cemento enamel line, the margin of the gum overlying the pocket, and also to the bottom of the pocket. If after the treatment, these measurements are again taken the slightest change in any of them may be detected. Reports of this character would have a scientific value, which they do not now possess.

Before closing, I must refer briefly to one more point in Dr. Patterson's paper. He says, "In the treatment of pyorrhea alveolaris, we are not dealing with a condition that **per se** endangers life."

I feel that in making this statment, he refers strictly to the local aspect of pyorrheal pockets. For the fact is now generally recognized that some of the most serious diseases, which occur in other parts of the body are caused by organisms which are carried by the blood stream from these and similar septic foci.

I believe it will be found that pyorrheal lesions are more dangerous than diseased tonsilar crypts. They certainly furnish as good cultural conditions for transmutation as do tonsilar crypts, while the organisms are in closer contact with broken blood vessels, and the lymphatic protection is less perfect.

In addition to these more unfavorable conditions, we must add the pressure of mastication, which would tend to force the organisms into the tissues.

I would advise all to read an article dealing with the transmutation of the diplo-streptococci, by Rosenow, published in the January number of the Journal of infectious diseases. It will help us to realize the dangerous character of these lesions, which it is our duty to prevent and cure.

A. F. James, Chicago, Ill.

For the most part I agree with Dr. Patterson's ideas. I wish to call attention particularly to one point which I have never seen mentioned in literature. That is regarding the real effects of vaccines upon the organs and tissues of the body. In a structure as complicated and extensive as the human body, it is quite a difficult thing to trace the effects of a given poison or injury unless the havoc wrought is immediate, and the injury is so very extensive as to cause gross anatomical lesions. Thus damage may often be occasioned by some procedure without our being aware of the fact. This is probably the case with the introduction of heterologous or foreign protein into the blood stream. For example, Longcope* experimented by injecting small doses of horse-serum and egg-white into dogs, cats, rabbits and guinea-pigs which had been previously sensitized to these proteins. He found that these foreign proteins caused injury

*W. T. Longcope, "Production of Experimental Nephritis by Repeated Proteid Intoxication." Journal of Experimental Medicine, Dec., 1913, Volume XVIII, No. 6.

to the cells and various organs and tissues of the bodies of these animals.

The reactions were inflammatory in character. After intraperitoneal injections in the peritoneum and after intravenous injections in the livers of rabbits and cats the changes are especially marked, and changes were also found in the myocardium (heart muscle) and kidneys of all groups of animals.

While egg-white in large doses is injurious to the kidneys of animals, its toxity is greatly increased thru previous sensitization of the animal. While the quantity of heterologous protein contained in the bodies of dead bacteria which are injected in a dose of vaccine is very minute, yet we must remember that the individual who is being treated for pyorrhea has probably been previously sensitized by the circulation in the blood of the same kind of bacteria which is contained in the autogenous or stock vaccine. While I know of no published reports that nephritis has been observed following the administration of vaccines, it must be remembered that such an effect can only be determined upon careful examination. For instance, in chronic interstitial nephritis, no albumen or casts may be apparent for three or four days, and it would be necessary to collect the total quantity of urine past in the 24 hours and examine this for a number of successive days in order to be sure that the urinary findings were negative. Furthermore the surest evidence of chronic interstitial nephritis (one form of Bright's Disease) is probably a continued high blood pressure. Hence it would be impossible to determine the fact of nephritis existing without taking observations of this kind. It is probable that there are few of those who are administering vaccines who have taken the precaution to make such a careful examination of their patients as indicated above. If this were done before administering the vaccine and again after the expiration of some months, such examination might reveal the fact that the vaccine which was supposed to cure or benefit the pyorrhea has in reality produced Bright's Disease, Heart Disease, Sclerosis of the liver or other serious disorder. While I have no cases which I am at liberty to cite at this time I desire to call your attention to this point in order that others may be interested in making observations along this line so as to learn what are the real effects coming from the administration of vaccines.

In a conversation I had with Dr. Hartzell this noon he regretted very much that he could not be present. He wisht me to put him on record here as saying that it was no less than criminal for a man to use vaccines until he had removed all local foci, and then only when the system need aid or stimulation in its reparative process. He wisht this to be stated very emphatically and I wish to go on record with him.

Albert H. Stevenson, Brooklyn, N. Y.

We need not a Daniel to translate the writing on the wall, as a substitute for local treatment in Pyorrhea and even as an auxiliary to such treatment the autogenous vaccine has been "weighed in the balance and found wanting." With due respect to the pro-vaccinationists, with all their diligent and exacting preparation and application of the much exploited vaccines, results have hardly justified the means. Why?

Have we not in our zeal neglected the very fundamentals of Bacteriology? As the essayist so tersely remarked "in Pyorrhea we are not treating a disease but a condition." What bacteria have been found at the sites of infection have been mixt infections, eleven varieties having recently been described by Hecker.

Primarily, we have no immunity producing vaccines for Pyorrhea simply because we have been unable to isolate the proper bacterium to prepare such vaccines according to that fundamental principal of bacteriology Kochs Law or

Postulates. To fulfil this law we should be able to isolate the organisms in pure culture, to cultivate them under artificial conditions then to reproduce the lesion by inoculation into susceptible animals and to continue indefinitely by inoculation from healthy animals, and prove that no other organism will produce the lesion.

Then again the opsonic index so counted upon has proven unreliable and Wright himself does not now insist upon its determination. "One of his assistants, Mathews, has recently made a statement that in a great number of cases the determination of the opsonic index is out of the question."—Citrons Immunity.

All that has really been accomplished with vaccine therapy in Pyorrhea has been the raising of the natural resistance of some patients. Even if we had no other effective treatment this would be a doubtful procedure, when we consider the dangers attending the inoculation. Aside from the discomfort and possible nausea that often occurs during the negative phase, there is the ever present danger of anaphylaxsis. As we learn from investigators that one millionth of a gram of proteid injected into the blood stream will sensitize a guinea pig fatally and that one ten millionths of a gram, when injection is repeated into the human circulation, may cause grave symptoms, (C. C. Voelker in Items of Interest, March 1912,) we begin to realize what it means to inject "alien proteid" into the precious Life Stream. Anaphylaxsis is the antithesis of prophylaxsis, so it is possible to produce the very reverse of what we desire, so I say, even if there were no other treatment for Pyorrhea the use of vaccines, with accompanying dangers seems hardly justifiable. In fact the vaccines have not even justified themselves. The most earnest pro-vaccinationists admit that local treatment should accompany the vaccine treatment and both Dowsett, of London, (Proceedings XVII Int. Cong. of Medicine 1913) and Viney (Dental Cosmos 1914, pg. 833). While attempting elaborate defenses of vaccine therapy admit that their own real successes were only when local treatment was incidental to the inoculations. On the other hand we have consistent local records of numberless cases showing the positive results in health improvement accomplished solely by proper instrumentation and prophylactic treatment, which incurs no danger of nosystemic disturbance.

Dr. R. G. Hutchinson, Jr., of New York City, reports: A case was under treatment, both vaccine and surgical, by a fellow practitioner for between two or three years. Apparently, a cure was effected. The patient applied to me for treatment Sept. 23, 1912. The condition then was more acute than it had been at any former time and it was necessary to extract one of the molars. The support being practically all gone, and the pulp having died as a result of the Pyorrhea, an abscess had resulted. There were large quantities of serumal calculus which had never been removed, deep on the roots. Excessive stress at certain points caused motion of individual teeth in occlusion, and there was a profuse discharge of pus. The patient was in an extremely low condition of vitality and of a highly nervous temperament. The occlusion was ground at certain points, and surgical treatment was begun on September 27, 1912. The case was dismist Oct. 24, 1912. The following February light scaling and polishing was given, and on March 24, 1914, the second Prophylactic treatment was given. The mouth is now in a perfectly healthy condition.

Dr. Paul R. Stillman, of New York City, reports a case as follows:

Mrs. H. Married one year, age approximately 25 years. Has Pyorrhea since school days. All teeth involved to some extent but those most advanced were the R. L. L., L. L. L., and L. L. C. These

three teeth were flowing pus copiously and were very loose. All the teeth responded to treatment and are normal except these three.

Treatment: The lower anterior teeth were made fixt by a grass line splint, which was removed every week. While the volume of pus was somewhat reduced after sterilizing and filling the root canals, no encouraging signs of convalescence was noticed. Her husband, who is a physician, consented to the administration of vaccines which were made and introduced by a pathologist. Adminstration was followed by temperature and nausea acting 24 to 48 hours.

Prognosis. The left central and lateral are doubtless septic; have advised extraction. The vaccine has had little or no effect on the pus flow, which is still copious.

And so I could continue ad finum. With the more positive effective local treatment available why subject the delicate chemical balance in the bodies of our patients to that more or less serious disturbance of their physical economy.

The most forceful argument I can use is the warning of the great Sir A. E. Wright himself:

"So long as we, as a profession, go on hankering after the impossible, so long as we demand of every new therapeutic method that it shall after the method manner of a magic wand achieve the marvelous with little labor, and that it should give its best results even when it is applied in a blind empirical manner, so long will disillusion continue to dog the steps of medicine."

"It would therefore be well that in connection with vaccine therapy we should appreciate the limitations which are inherent in the method, and the labor which its proper conduct may entail, and further that we should distinguish between the cases where we may hope to achieve certain and easy success, and the cases where success, if achieved at all, must be dearly bought."

"It follows that if we are not immediately successful in destroying all the infecting micro-organisms—and in such immediate success can hardly be expected except in the case of incipient infection—we have to make up our minds to go in for a program of periodical inoculations—just as a gardener who undertook the task of clearing the weeds out of a neglected garden would make up his mind to renew his efforts week by week until his purpose was accomplished. And just as in gardening, no one is surprised if the weeds spring up again, so in connection with bacterial infections recrudescence and fresh reinfections must be expected where a residue of microbes are left in the body, and where the channels thru which infection originally found entrance are left open and unguarded."

So says the greatest vaccinationist of them all.

DR. HOWARD T. STEWART, of New York City:

We are almost all agreed, I think, upon the subject of vaccines. The dental profession have not wanted to believe in vaccines, to begin with. The thought is somewhat repulsive to them. I think the general consensus of opinion is that it has practically become useless, and that we are practically agreed on that as far as the practical value is concerned. Along that line I want to call attention to the work of Dr. Arthur H. Mary, of New York City, whose investigations I have been watching carefully during the last two years. Dr. Mary took up this vaccine treatment in an enthusiastic way, as a pioneer, was probably as early as any man in the profession to apply it vigorously. He pursued this treatment for a considerable length of time. He got what he thought were fine results, and he did get fine results so far as the treatment of Riggs Disease was

concerned. During the first three or four years he wrote several articles on the subject, and enlisted the sympathy of the medical profession to a large extent, and was getting a great many patients sent to him. It is a little hard for a man under those circumstances sometimes to change his mind and give up his opinion and say it is of little or no value. But I know that Dr. Mary began to suspect that, with his improved technic and operative procedures, the results were due mostly to those procedures, and he began in a very conscientious way to test the fact. I know of no man who has gone to so much trouble to test this thing, to see whether his results were actually due to the vaccine treatment in any measure or not, and he has finally come to the conclusion, and so announced, that the vaccine treatment is useless. I thank you (Applause).

DR. OAKMAN, of Detroit:

I cannot let this question of vaccines go by without having a word to say. When you say that vaccines are of practically no value, it seems to me the men making this statement do not know whereof they speak. Vaccines in my hands have been one of the finest agents I have ever used. Cases of necrosis of the jaw, sinus trouble, antrum troubles and other pus conditions about the body have been lessened by the use of vaccines, and when you state that they are of very little use, I will say that I believe it is being overdone in the treatment of pyorrhea. The idea of shooting a patient full of from 200,000,000 to 750,000,000 of bacteria, when it can be done by manipulative and instrumental skill is bad. But I believe in the treatment of pyorrhea that vaccines have a place. As I was telling my good friend, Dr. Hunt, coming down on the street car, I have had the blood pressure drop 40 points, where the blood pressure was at 210, the patient taking a long rest reduced it to 185 and eventually to 180, and he thought that would be his blood pressure from that time on; but after a chronic case of pyorrhea was treated, inside of six weeks he said, "I haven't felt as well since I was a boy," an intelligent man. That is only one of other similar cases, where the drop in temperature has not been as great as 40 degrees but has been very appreciable. I have had cases where they felt that senile degeneration was taking hold of them. One man was 53 years of age, and I could not arrest the pus after an operation, could not arrest the flow. One injection of an autogenous vaccine, made from this yellowish-greenish pus and the prodigiosis began to lessen in 46 hours, and the second injection eliminated the pus completely, where it had been an open wound for five weeks. It seemed like an antrum condition. It was in the region of the antrum but the antrum was not involved. I want to make a plea for the sane use of vaccines. I do not think that over ten per cent of the cases of pyorrhea, possibly a little more, are cases that it is feasible to use vaccines in, but when you knock vaccines right off the boards, you are going too far. As a rule, the dental profession are a little loath to take up these things, but now it is my practise, in every suppurative case, a chronic suppurative case, to always get the blood pressure, and I notice marked changes in my patients. I hope before you condemn the use of vaccines you will consider it very carefully. I thank you. (Applause).

DR. SARAZIN, of New Orleans:

Mr. Chairman, ladies and gentlemen. I think we should thank Dr. Patterson for sounding the fog horn in time. The tendency to go into a line of treatment, the real value of which still remains unproven, is a dangerous one, and attention should be called to it in ample time. I do not know that we can apply the

same therapy to pyorrhea conditions—which I prefer calling Riggs' disease, because the name covers more ground than does "pyorrhea"—I do not know that we can compare pyorrhea conditions with other septic conditions which are of a more acute nature. The condition of pyorrhea is essentially chronic, and in chronic conditions, where health is needed by the general system, it is not the health which may be needed by stimulation but it is really the health by fortifying. I doubt that any case of pyorrhea could ever be benefited by the use of vaccines alone. I have never heard a case reported where the vaccine treatment has merely been tested, with the omission of the proper local surgical treatment. If such a thing has been done, our faith in the value of the vaccine treatment would necessarily be strongly influenced, if not compelled. As I said before, it is not a question of stimulation by means of vaccines, but it is really the necessity of fortifying the entire blood current and its quality which is needed. To my mind, with other local surgical treatment, the virulency and the quantity of the emanating foci of infection are lessened, the phlagocites and the leucocites of the blood are able to battle the invaders which come thru the absorption of infection by the blood currents and thru absorption following the digestion thru the alimentary canal, and as soon as the infection is reduced the blood is enabled to battle against the invaders and overpower them. On the other hand, as long as the septic conditions from the mouth are so extremely numerous and virulent, then the phlagocites and leucocites of the blood are unable to dispose of them and destroy them. Therefore, when we need the help of systemic treatment, it is not really the vaccines we need. It is a means of improving the quality of the blood at the same time as we improve its circulation so as to fit those tissues which are so placed in the human anatomy as to necessarily receive a lesser amount of arterial pressure than do the tissues placed below the heart. I do firmly believe that we should thank Dr. Patterson for sounding the alarm in time. I do not doubt the feasibility of getting good results from vaccines in acute conditions, where the effect of vaccines may be not only marked but may prove very beneficial; but when we come to a chronic condition such as pyorrhea then I believe we are working in the wrong direction if, still groping in the dark, we make an excessive use of such a mode of treatment. I have thoroly tested the value of vaccines. I started with stock vaccines, made cultures of autogenous vaccines, and have gone as far as to make dynamics of autogenous vaccines, in order to satisfy myself that there might or might not be some degree of help obtained from the vaccine treatment, but have been forced to the conclusion that in no case did I receive any help from the vaccine treatment, and that the success, whenever it occurred, was due primarily to the local surgical treatment, and in a secondary manner to whatever systemic treatment was indicated in the case, for we cannot in all cases apply the same line of treatment; it will depend entirely upon the nature of the systemic disturbance, whether the systemic disturbance may in some cases have preceded the pyorrheal conditions, as, for instance, in diabetis, or whether the systemic disturbances have caused manifestations of septicemia in one form or other. I thank you. (Applause).

DR. PATTERSON: I haven't anything to add. I feel very much gratified that the men who have discust the paper so thoroly agree with me, and as none of those who oppose the sentiments of the paper have spoken I hardly think we should lengthen the discussion. I am pleased to be endorsed by such

able men. Indeed, I consider and you consider, I know, that some of the papers written in the discussion were written by more able minds than my own but were not written by those who have had more experience. My mind has been open for many years, since new methods have been suggested for the alleviation of this very distressing trouble—my mind has been open and I have watched carefully and my conclusions are as embodied in my paper. I do think that very much harm is being done, especially in our part of the country, for in Kansas City more vaccines are given for the treatment of pyorrhea than in any town in the world so far as I know. Daily many inoculations, every day of the week and of the month, performed regardless of physical condition, regardless of tests for conditions which should be looked into carefully, and I have in my feeble way here and there sounded a note of warning in regard to the giving of vaccines for the treatment of a condition of pyorrhea or any similar condition. I am not entirely a disbeliever in vaccines, but I am talking about vaccines for pyorrhea. Dr. Oakman spoke about the relieving of the blood pressure and its dropping down to a certain point, but he did not say that was without local treatment. You and I, who have been treating pyorrhea constantly for years and years have reduced the blood pressure just as rapidly as the vaccines dare do it, in 48 and 72 hours, or in less than a week. We have seen anemic people, pallid people, subject to faulty metabolism, in a few days almost "rise and walk" when they couldn't do it before, without any vaccines at all; the flush come back to the fact, to springiness to the step and the happiness over their spirits, without the vaccines. So when he speaks about the blood pressure being relieved so rapidly, you and I have done the same thing without any vaccines at all. I thank you. (Applause).

THE RESEARCH DEPARTMENT.

CONDUCTED BY THE
SCIENTIFIC FOUNDATION AND RESEARCH COMMISSION
OF THE
NATIONAL DENTAL ASSOCIATION.

All Communications for this Department Should be Addrest to the Chairman, Weston A. Price, M. S., D. D. S., 10406 Euclid Ave., Cleveland, Ohio.

DENTAL CARIES.

By Russell W. Bunting, D. D. Sc., and U. G. Rickert, B. S., M. A.

(Being the work done upon this subject in the laboratories of the University of Michigan under the auspices of the Research Commission of the National Dental Association during the year 1914-1915.)

IN A PREVIOUS report* we stated the various factors which entered into the problem of dental caries and attempted to give a general survey of the whole field of research as applied to this subject. And in continuing our investigations during the past year we have confined our attention almost solely to one factor in the process of caries, as stated in our former report, namely the resistance of the tooth. It is then, our purpose in this report to state the work which we have done as correlated with that of others who are engaged in the same field, and set forth whatever conclusions we may hold at the present time. In order that our former statements may be at hand in this discussion we take the liberty of repeating the same.

*Official Bulletin of the National Dental Association, Vol. 1, No. 4, page 16.

RESISTANCE OF THE TOOTH.

That caries of the teeth is largely dependent upon the character and quality of the teeth nas in all ages found a wide acceptance. Many have claimed that from clinical data there could be no doubt but that the so-called "soft" teeth were more liable to caries that those of a harder and more perfect variety. The susceptibility of such teeth was attributed to a deficiency in amount and organization of their inorganic constituents. Several observers have made investigations in the attempt to gain some definite information in this regard.

Among the results which have been obtained, is the work of G. V. Black*, who in the compilation of a large number of analyses of teeth came to the following conclusions. "No diminution of density or percentage of lime salts occurs in the teeth of women during the process of child-bearing because of that fact. Any basis for accounting for caries in this or that case on account of "frail teeth", or 'teeth below the medium in structure', 'poorly calcified teeth,' etc., must disappear." This later statement he based upon the fact that the specific gravity and lime salt content of carious teeth was equal to that of immune teeth.

*Dental Cosmos, Vol. 37, page 353.

In this regard W. D. Miller stated* that his observations lead him to the view that "the enamel of different persons, as well as the different teeth of the same person and different parts of the same teeth, does show difference in resistance to acid; likewise the thickness of the enamel cap as well as the integrity of the enamel surface, freedom from fissures, bruises, cracks, weak lines of imperfect calcification of prisms, etc., as far as these come within the sphere of infection * * * * * * * * * * the resistance of the enamel is only one of the factors (of caries) and its import will be found to vary greatly in different cases."

H. P. Pickerill, in his work on dental caries** has done much to show the variance in enamel surface of teeth in a graphic manner. He succeeded in rubbing graphite and silver nitrate into the surface of the enamel and demonstrated that the permeation of certain forms of "soft" teeth was much greater than that of the hard varieties. In his conclusion he states, "That these departures from the normal structure are potent factors in lessening the resistance of the teeth to caries cannot be doubted. They must favor considerably the retention of food-stuff and micro-organisms; they expose a larger and more vulnerable surface to the action of the acid produced; they negative both mechanical and physiological prophylactic measures; and the fissures which have been described, since they allow of the penetration of silver nitrate and graphite, must permit the penetration of lactic acid, if not of carbohydrates. In fact ceteris paribus, it may be quite logically inferred that the amount of graphite which an enamel surface retains is a measure of the amount of food stuff it would tend to retain, and a demonstration of the situations of its retention. Added to which is the demonstrable fact that teeth so affected are not infrequently likewise the subject of caries."

In addition to these we have the writings of Boedecker, Caush, Von Abner, Fliechmann, Von Beust, Baumgartner, and many others who believe that the dentin and enamel are capable of change in structure and density due to an internal metabolism. Also those of Erdheim who has found that rats from which the parathyroids have been removed have poorly formed enamel. From all of these writings we see that there are many who hold that the susceptibility of the teeth to caries is largely determined by the perfection of the formation of the teeth, and that changes in the susceptibility may be due to changes in the enamel and dentin as the result of internal and nutritional causes.

In the light of our present knowledge there can be little doubt but that certain teeth are more susceptible to caries than others. In spite of the fact that the percentages of lime salts in such teeth do not vary perceptibly from the normal, it seems very evident that the manner of organization of the various enamels and dentins may determine to a certain extent their permeability and solubility. In addition to this, the degree of glaze upon the enamel surface, and the perfection of union of enamel surfaces in the sulci of teeth is a large factor in the determination of the amount of food stuffs retained in its immediate vicinity. But altho we may grant that the resistance of the tooth is a factor in the process of caries, the opinion that it is a predominating factor has not obtained general acceptance. We have so frequently seen teeth which were soft and imperfectly formed which, even in the stress periods of life of the individual, have suffered little from caries, and we have seen the strongest and best formed teeth in other individuals readily succumb to the ravages of caries. So that, recognizing the effect which the resistance of the teeth may have as a factor in dental caries, we are forced in our search for the determining causes, to turn to those factors which lie without the teeth as exprest in the attacking force.

Since the time of making this statement there have appeared several contributions which have a bearing upon this phase of the subject. The first was that of A. W. Wellings, L. D. S., in a paper entitled "The Staining of Dental and Adjacent Tissues of Some Rodents by Means of Trypan Blue Introduced into the Animals During Life," which was given at the VIth International Dental Congress in London. In this paper he described the general and intense staining powers of this dye when introduced into the living body and carried by the blood stream to the tissues. His investigation was especially directed toward the question of the extent to which the circulation thru the pulp of the tooth might influence the dentin and enamel, taking the depth of the penetration of the trypan blue as an indication of the depth of penetration of the circulation. In his conclusions he states, "The matrix of dentin and bone is stained very lightly, the color disappearing quite soon. The walls of dentinal tubules and haversian canals do not stain, neither do the dentinal fibrils, but the periosteum stains deeply. Enamel developing at the time of the introduction of the stain and that formed while the stain is in the body, takes on a very brilliant color, which subsequently fades as calcification progresses. *It is not possible to stain already calcified enamel by means of trypan blue.*" ***

*Dental Cosmos, Vol. 47, page 30.

**Pickerill, Prevention of Dental Caries, and Oral Sepsis.

***Italics ours.

In the Journal of Allied Dental Societies for 1914, page 391, Dr. W. J. Gies reports work done in his laboratory along similar lines to that of Wellings. As to the results obtained he describes the coloration of the teeth as follows: "It was found that in all cases the pulp had been stained a deep blue to bluish black, and the dentin was similarly, tho less intensely, pigmented. In some cases the pigment colored the entire mass between the dentin and the external enamel surface a pale, tho perceptibly blue, indicating the trypan blue had past internally from the pulp thru the dentin into the enamel, or externally from the alveolar membrane, or both."

In a paper entitled, "Studies of Internal Secretions in Their Relation to the development and Condition of the Teeth"* Dr. Gies reported work done similar to the former researches of Erdheim, Toyofuku and Pappenheimer on the dental effects of Thyroparathyroidectomy and Thymectomy in rats and other animals. Among his opening remarks he makes the following statement. "Speaking with apparent conviction and authority on the present status of knowledge of dental caries, Bunting said: 'It is pretty well considered that altho it may be possible for the structure of the tooth to enter into the question to a certain extent, it is not looked upon as being responsible for the sudden and obscure changes in susceptibility, except by those few believers in the mutability of the tooth in response to general physiological change. So that investigation today is being focussed upon the environment of the tooth, the saliva, ingested food, etc., seeking in them the changeable element which determines caries.' We happen to be among the 'few believers in the mutability of the tooth in response to general physiological change,' i. e., to systemic nutritional influences, especially destructive ones." After reporting a long series of observations relative to the effect of operative interference with the internal secretions upon the teeth both during development and maturity, the author gives the following conclusions: "Our data for thyro-parathyroidectomy, while suggesting support of Erdheim's conclusions regarding the decalcifying effects of parathyroidectomy, are inconclusive. The experiments on thymectomy failed to show that calcifications were in any way affected by the removal of the thymus. Rachitic changes in the bones and teeth occur in young albino rats as the result of **spontaneous** disease, possibly of infective origin."

*Dental Cosmos LVII, page 276.

BODILY METABOLISM AND TOOTH STRUCTURE.

In a consideration of the deteriorating effect of the general bodily metabolism upon the structure of the tooth in its relation to dental caries there are three phases of the problem which must be considered, *first*, the effect during the formation of the teeth; *second*, the effect thru the pulp of the tooth on the fully formed and mature tooth structures, and a *third*, which we will mention a little farther along.

First.—In the formation of the tooth the odontoblasts and the enameloblasts are simultaneously forming dentin and enamel, and both require calcium salts from the circulation in the formation of their respective structures. It is true that a portion of the nutrition for the enamel formation is stored in the stellate reticulum, but the bulk of the enamel building material is taken from the circulation. We know that either continuous or temporary arrest of the general nutritive functions causes a corresponding effect upon the quality of tooth structures which are formed at that time. Enamel formed under such conditions will be imperfect and incomplete in both form and quality. Dentin so formed will contain many places of imperfection and defects known as "Interglobular spaces." There

is little doubt, as has been stated, that the imperfections in the formation of the enamel induce the inception of caries, other conditions being favorable. Also dentin which is poor in its developmental structure offers little resistance to the progress of caries and favors its rapid spread and penetration. Such developmental defects are seen in individuals who during the period of tooth formation have suffered from rachitis, scurvy, infectious fevers and other malnutritions, especially those which have a direct effect upon the calcium metabolism. All such teeth possess a permanently lowered resistence to the attack of dental caries which fact must be recognized, but as many such teeth never suffer from caries we cannot say that it is an all predominating or determining factor in the process of caries.

Second. — As regards the effect of the general metabolism upon the life history and caries susceptibility of mature and fully formed tooth tissues information is less positive and more difficult to obtain. We do know that mature dentin does undergo constructive changes as the result of certain forms of irritation. In such cases the dentinal tubuli which normally are patent and contain organic fibrils, odontoblastic prolongations from the periphery of the pulp, may and do become obliterated by calcific deposition. Accepted opinion holds that the calcium salts so deposited are introduced into the dentinal tubuli from the circulation of the pulp by the process of osmosis. That constructive calcification of the dentin does occur is unmistakably seen in thousands of sections of teeth which have been made.

But can we say, conversely, that under different conditions the circulation thru the pulp may deplete or extract from the dentin lime salts which they contain and thereby weaken the dentinal matrix? We know that in certain forms of rachitis and osteomalacia that mature and formed bone may lose its lime salts and become softened. And **a priori** it has been inferred by many that the dentin may be depleted under similar circumstances. There are two facts which are in contraindication to this view. One, that altho there are several points of structural similarity between bone and dentin, there is reason to believe that dentin is a more stable structure than bone, and is not so dependent upon metabolic changes or nutritional support. When the pulp of the tooth dies and is removed there is but little subsequent change in the dentin. It becomes somewhat more brittle due to the loss of vitality of its organic substance, but the inorganic material is so well organized that the dentin may perform its function for many years after its pulpal nutrition has been discontinued. The same cannot be said of bone. And, second, in the thousands upon thousands of sections of teeth which have been made but few have ever been reported which gave evidence of any deterioration or depletion of formed dentin under systemic malnutrition. We can recognize the constructive changes. why cannot we see the destructive changes if they so frequently occur?

Inasmuch as it is the enamel which is first attacked by the inception of a large percent of dental caries, the theory of nutritional effect of the caries susceptibility of teeth must establish that a degenerative change may take place in the periphery of the enamel as a result of nutritional changes in the pulp. All that has been said as to our present doubt of nutritional depletion of the dentin applies to the enamel also, as any such depleting influence must needs pass thru the dentin on its way from the pulp to the enamel. In addition to this, we have not as yet had sufficient evidence to assume that the enamel contains any set or system of canals, nor any considerable amount of organic substance. When we consider the method by which the enamel is formed and its histological structure the probability of its nutri-

tional mutability thru the pulp of the tooth seems very slight. Just as it has been difficult in times past for those observers who hold to this theory to prove that their contention is true, so also is it equally difficult to prove that such is not the case. Our conclusions and present view of this question is that from a histological standpoint, and a careful consideration of the facts in the case we can see little evidence in support of the statement that teeth may become more susceptible to caries because of nutritional depletion by way of the pulp.

Third.— But on the other hand, there is abundant clinical evidence that a connection exists between the general nutrition and the condition and structure of the enamel. Every observant operator has seen cases in which the enamel underwent a distinct change in color and structural density co-incident with a change in the general health or metabolism of the individual. So also have they seen a decided change for the better in the enamel of cases which have recently arrived at a time of life when immunity to caries might properly be expected. So that in spite of all theorizing to the contrary there is a just and reasonable ground for believing that the resistant properties of the tooth are dependent upon the general metabolism and nutrition to a greater or less extent and in this connection we have become impress with the fact that there is a third method or avenue by which this might be accomplished, namely, thru the saliva. By this we mean that there is a possibility of enamel change because of nutritional disturbances which have influenced the character of the saliva and which in turn has produced an appreciable change in the external surface of the enamel. This view of the problem seemed to be of sufficient importance to warrent us in spending a major portion of our time during the past year in the study of the effect of saliva upon tooth surfaces and its relation to dental caries. The results which we have to report do not in any way indicate the amount of time and labor which has been expended to make the study a careful and trustworthy one, and altho some of the efforts have met with disappointment, still, in the opinion of those who have been engaged in the work, much of the data obtained has a special significance to the problem of caries susceptibility.

In his work on "Prevention of Dental Caries and Oral Sepsis," H. P. Pickerill describes a graphic method of determining the porosity of the enamel surfaces and the variations in same. This he accomplished by impregnating the enamel surfaces with graphite and silver nitrate taking the depth to which these materials could be introduced as indicative of the relative density and completeness of their organization. His views as to the importance of this porosity of enamel surface in relation to dental caries are stated above.* One of the most significant statements which he made in this regard was that unerupted teeth were considerably more porous than those which had been in place in the mouth for some time. From which he reasoned that the saliva exerted a hardening effect upon the surface of the enamel after the eruption of the tooth.

As to the exact nature of this hardening process we have little accurate information. We may infer that in the unerupted tooth there are certain external openings which are microscopic in their size but patent enough to allow the entrance of fluids such as a solution of silver nitrate. When in the presence of saliva these openings become filled up to a greater or less extent, and are no longer deeply penetrable by the silver nitrate solution, it is very possible that this obstruction of the enamel openings is by deposition of salts from the saliva by a physico-chemical process which is similar to that of petrification or the for-

*See page 248.

mation of calculus. And if this consolidation is produced by the saliva, then the amount and completeness of the enamel hardening will be in direct relation to the nature and composition of the saliva. This then leads us to a consideration of the saliva in quest of the properties which are responsible for this calcifying process upon the teeth. We accordingly, in the pursuit of this problem, have turned our attention to a study of the saliva in its relation to the character of the enamel surfaces and susceptibility to dental caries. In our search for this variable among the inorganic constituents of the saliva we made quantitative estimations of the total ash. The results so obtained were disappointing as there appeared to be no correlation between the variation of total ash in the salivas examined and the condition of the teeth. When, however, we made quantitative estimations of the calcium content of the various salivas the results obtained had a more significant variation and gave promise of being worthy of careful consideration.

Inasmuch as the total amounts of calcium to be found in samples which were easily obtainable were exceedingly small, and as this calcium was mixt with a large number of other substances which are commonly found in the saliva, it was necessary that the method of the determination be very carefully worked out in order that the results obtained might be reliable. After very thoro trial the following technic was adopted as the method by which all our determinations should be made: 25 ccm. samples of saliva were dried down in platinum crucibles over a sand bath. The residue was converted into the oxides by heat and burned until they turned to a white powder. This residue was then taken up with dilute acetic acid, brought to a boiling temperature and precipitated with hot ammonium oxalate. This solution was allowed to stand for several hours and then filtered. The precipitate was then washed, dried, and again converted to the oxide of calcium by heat in a platinum crucible, in which form it was weighed. All data on calcium determinations are given in the form of CaO obtained from 25 ccm. of saliva.

CALCIUM DETERMINATION IN THE SALIVA.

Our estimations of calcium were made on the following classes of cases; students who appeared to be continuously immune to dental caries, students who were plainly susceptible and others who were indeterminate, women in the maternity ward of the hospital, negroes, and children. In every case an effort was made to check up the appearance of the enamel surfaces, as to color, density, and opalescence, with the calcium content of the saliva. We found that the various salivas gave readings which ranged from .0015 mgm. to .0040 mgm CaO per 25 ccm. of saliva. These readings remained fairly constant for each individual in tests extending over several months and did not vary materially when taken at different times of the day. All samples collected were of the whole saliva by means of chewing paraffin.

In eight characteristic cases of distinct caries immunity the readings were as follows:

.0035 mgm CaO in 25 ccm. of saliva
.0037 " " " " " " "
.0039 " " " " " " "
.0033 " " " " " " "
.0042 " " " " " " "
.0029 " " " " " " "
.0029 " " " " " " "
.0031 " " " " " " "

In four cases of students who were distinctly susceptible the readings were as follows:

.0022 mgm CaO in 25 ccm. of saliva
.0020 " " " " " " "
.0024 " " " " " " "
.0017 " " " " " " "

Without exception in these two classes of cases which were found among the students of which but a few have been cited every individual who had hard, well formed, and dense teeth which were free from caries had a calcium content of his saliva equal to from .0030 mgm to .0040

mgm CaO, while in those cases of soft appearing and rapidly decaying teeth the calcium content was not more than .0025 mgm CaO per 25 ccm. of saliva.

Of a number of indeterminates in which an occasional cavity had occurred the readings were as follows:

.0026 mgm CaO in 25 ccm. of saliva
.0023 " " " " " " "
.0025 " " " " " " "
.0030 " " " " " " "
.0025 " " " " " " "

The salivas of over 50 women in the maternity hospital were examined at various stages of pregnancy, some of which were re-examined at intervals up to the time of their delivery. The data so obtained showed that the calcium salt content of these cases varied over a wide range, from .0015 mgm to .0035 mgm CaO in 25 ccm. but on the whole they were decidedly lower than individuals of the same age. We found that many of these cases in which there was a low calcium content, also had a large number of cavities and a peculiar whitish to blue-white appearance of the teeth. In many cases the tips of the incisors and labial and buccal surfaces were turned to a white chalky condition. It was also noted that as these patients advanced in pregnancy the saliva decreased in calcium. This decrease became very marked at the eighth month when the calcium fell to .0015 mgm and .0017 mgm CaO per 25 ccm. There was some exception to this as several cases, especially among the negroes, remained high thruout their period of pregnancy. These cases all had yellow, dense appearing, enamel and were seemingly not susceptible to caries.

Results obtained from the examination of the salivas of a number of children were surprisingly high as none were found which ran very low while many were exceptionally high. The readings in 5 such cases were as follows:

E. L. Age 11 .0032 mgm CaO in 25 ccm. of saliva
F. B. " 5 .0037 " " " " " " "
C. S. " 10 .0025 " " " " " " "
C. Y. " 11 0022 " " " " " " "
P. F. " 9 .0030 " " " " " " "

In our correlation of the calcium content of the saliva to the condition of the enamel surfaces we were forced to rely upon observation and the presence or absence of new cavities in the teeth. It was our experience, however, that whenever the content was high the enamel surfaces had a more dense and opalescent appearance with every indication of surface condensation. While in many of the cases in which the calcium was low the teeth were white or blue-white in color and had the appearance of roughness and permeability. So noticeable was this fact that we could roughly estimate the amount of calcium in the saliva of many individuals by the color and appearance of their teeth. A further correlation may be seen in the fact that implanted teeth and natural teeth used in bridge work, altho they may be quite different in color at the time of insertion, frequently change to the shade of the adjacent teeth. Since the nutrition of these teeth has been entirely cut off, this change in color and appearance can only be attributed to the influence of the saliva in which they are bathed.

In a consideration of the calcium content of the saliva in its relation to the health of the teeth there are two forms of action which should be considered. One, that of the possible part which it plays in the consolidation of the external surface of the enamel, thereby making the tooth less pervious to moisture and organisms and rendering the surface of the enamel more self cleansing. The second is the ability which a high calcium content in the saliva should exert in neutralizing acids formed in fermentation of carbohydrates, thus inhibiting their action upon the tooth in the production of incipient caries. This latter view was stated at some length by Dr. F. W. Broderick of London in a paper entitled "Calcium Metabolism and Dental Caries" which was given before the VIth International Dental Congress. He regards calcium in the form of bicarbonate

as the chief source of salivary alkalinity and its presence or absence he regards as a direct influence upon the process of caries because of its antacid properties. He discusses calcium metabolism in the body and the effect of the various internal secretions upon it, and states as his belief that the calcium content of the blood and the saliva is lowered during the stress periods of life thereby favoring the process of caries of the teeth. He claims to have raised the calcium index of the saliva by injections of a poly-gland substance composed of suprarenal, pituitary, and thyroid extracts. He concludes that "the predisposing cause of dental caries is a diminution of the calcium utilizing power of the body, due to a want of balance in the secretions of all the ductless glands brought about by any pathological condition causing extra stain to be thrown upon them."

These views which have just been stated are interesting as a correlation of our calcium study, but at the present time we do not feel justified in giving assent to the statement that "the predisposing cause of dental caries is a diminution of the calcium" in the sense that it is the all predominating influence in determining the process. We believe that there are many other factors which enter into practically every case of caries, of which the calcium of the saliva is but one. And yet we feel that the calcium in its relation to the surface of the enamel of the teeth, and in its power of neutralizing the acids of fermentation, is a very important factor in the process, which by its action may in many cases be able to swing the balance of forces toward immunity on the one hand or susceptibility on the other.

EXPERIMENTS ON ENAMEL SURFACES.

In a further study of this problem we attempted to produce consolidating changes in the enamel of teeth in the test tube under conditions somewhat comparable to those found in the mouth. With this in view, three extracted, unerupted third molars were split in half axially. One-half of each was placed in a test tube and given to three students whose salivas were high in calcium salt content. The students were instructed to cover the tooth with their own saliva and change same several times daily. These teeth were carried in this manner for 30 days, at the end of which time the three half teeth, together with their corresponding halves which were kept for control, were treated with silver nitrate in the following manner. The teeth were immersed in a 10% silver nitrate solution and subjected to reduced atmospheric pressure under an exhaust pump. The air was allowed to enter occasionally and again pumped out, which process was continued for about two hours, at the end of which time the teeth were taken out and placed in the direct sunlight for several hours. They were then sectioned and mounted for examination. In each of these cases, there was plainly seen in the original sections a marked difference in the penetration of the silver nitrate in the two halves, it being considerably less in the halves which had been carried in the high calcium salivas. An attempt was made to photograph the sections thus obtained. Figs. 1 and 2 are taken from one of the sets just described, Fig. 1 being the half which was carried in the saliva and Fig. 2 the control which had not been so treated. The partial filling up of the canals in the periphrey of the enamel which had been accomplished in the short duration of the experiment could only be attributed to an action of the saliva, as all nutritional processes had stopt.

In a comparison of the various types of teeth a number were selected which had polished and dense appearing enamels, and others which had a softer and less dense appearance. These were subjected to silver nitrate and in each case the penetration of the dense appearing enamels was less than of those which did not ap-

Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.

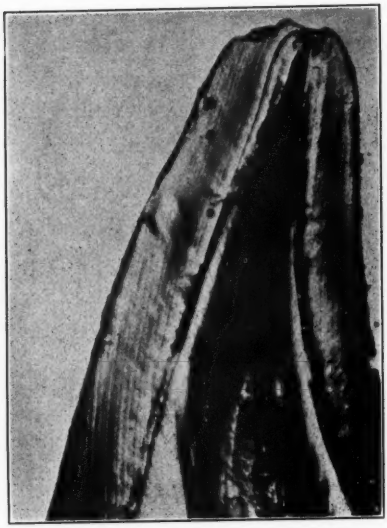


Fig. 5.

Fig. 7.

Fig. 6.

Fig. 8.

pear to be of good order. Fig. 3 is that of a central incisor with a dense labial surface into which the silver nitrate penetrated but a very short distance. The dark lines in the body of the enamel are not stain but are due to the lines of Retzius. Fig. 4 is that of a molar with a rough and poorly organized surface, into which the silver nitrate penetrated considerable distance.

It was seen that in cases of abrasion or partial wear of the enamel very little silver salt was taken up. This is very imperfectly shown in Fig. 5, in which abrasion had occurred in the tip of an incisor. The abraded portion took up no silver nitrate, the only color in the enamel being due to the lines of Retzius. Two very fortunate specimens were obtained, both upper cuspids which had obviously been under prophylactic treatment for some time. The surfaces of the enamel were highly polished and opalescent in appearance. Upon subjecting them to silver nitrate it was found that there was practically no silver stain in the enamel of either case. Fig 6 is a rather imperfect picture of one of these. All of the coloration in the enamel of this section is due to the lines of Retzius as no silver nitrate is to be seen in the original.

From the foregoing data we are led to believe that the process of consolidation of the external surface of the enamel is more completely done under the action of wear or abrasion either by mastication or by prophylactic measures. This, to us, is a very significant finding as it throws light upon the production of the dense and polished enamel surface which is seen in cases of abrasion, and also the highly opalescent appearance of the enamel which results from continued prophylaxis. This change in opacity and even in color of the tooth under prophylactic treatment has long been seen by workers in that branch, and many of them have accredited it to a molecular and metabolic change in the structure of the tooth. It is possible that such an abrasive action may produce consolidation of the dentin due to a filling up of the tubuli with calcium salts from the pulp, but experience teaches us that this seldom occurs as a result of abrasion unless the wear of the tooth has extended to the region of the enamo-dental junction and this does not occur in ordinary prophylaxis. From the evidence which is before us it is more reasonable to believe that the change in the color and optical appearance of the enamel in such cases is due to a more or less complete consolidation of their surfaces by the saliva which has been induced to continued polishing in the process of prophylaxis.

In a further consideration of this question we selected a number of teeth and polished them with disks and wheels until the enamel surfaces took on a high lustre. They were then split and one-half of each was put in a solution of calcium carbonate and calcium phosphate in water and rocked in a tippler for several weeks. At the end of this time they were removed and, together with their controls, were subjected to silver nitrate. We found upon examination of the ground sections that the peripheral area of porosity had not been removed by polishing. That is, the polished enamel surface was still porous to a certain extent. Also that the half which had been in the calcium salt and water was unchanged from that of the control.

We then made a similar experiment in which we used calcium acid phosphate and tricalcium phosphate in a solution of saliva. This series was carried in the tippler for about one month, the saliva-calcium solution being changed frequently. Upon staining and sectioning the teeth it was found that the halves which had been kept in the saliva and calcium salts were considerably less penetrated by the silver nitrate than were their controls. The experiment was not carried long enough to completely fill the exter-

nal enamel spaces but such a result might reasonably have been expected had the process been continued.

It is very evident that the process of enamel consolidation cannot take place without the presence of saliva, which indicates that the mucins or globulins of that fluid have a part in the process. In this connection we observed a very curious phenomenon when making these experiments. In every case in which calcium salt and saliva was employed, concrescences were formed on the roots of each tooth which bore a striking similarity to tartar. They grew to considerable size and completely covered the roots of the teeth but did not form on the enamel in any case. In those tests in which water and calcium salts were used without saliva no excrescences were formed. Two teeth are shown in Fig. 7 which have characteristic formations.

For the purpose of determining whether it is possible for salivary calculus to form upon the root of a tooth some distance beneath the gum similar to that which is so commonly known as "serumal calculus," the following experiment was made. A single rooted tooth was imbedded in modeling compound and the material trimmed to simulate the gum margin. The compound was then warmed and the tooth moved slightly labially and lingually, thereby creating a narrow space on these two surfaces similar to pyorrhetic pockets. These pockets were not wider than the point of a small knife blade. After chilling, the whole piece was put in a test tube, covered with saliva and calcium salt and then rocked in the tippler for several weeks. The tooth and modeling compound were then removed and the labial plate of compound was split off to expose the root surface. Fig. 8 which was taken of the case at that stage shows that a thin plate-like formation of tartar was formed over two-thirds of the length of the root from the gingival downwards. This tartar formation is very similar in appearance to many forms of "serumal calculi" and might easily be mistaken for it if sufficiently stained by putrefaction. It is a very striking specimen and has led us to consider whether or not some of the similar formations which are so commonly seen are not more largely derived from the saliva than has formerly been supposed.

TOOTH POWDERS AND PASTES.

Our study of enamel surfaces led us to look into the various methods and materials made use of in the care of the teeth both by the operator and the patient. We found that among prophylaxis workers there exists rather a wide difference of opinion as to the methods to be used in the care of the enamel surfaces, but all agree as to the end to be sought, that of high enamel polish and a continuous cleansing of the tooth surfaces by the patient. We found, perhaps, the widest diversity as regards the matter of dentifrices which should be recommended to the patients. Of the proprietary tooth-powders and tooth-pastes which are most largely used and prescribed by the dental profession there is little information at hand regarding the ingredients of which they are composed or the specific action which they have upon the teeth. It seemed to us therefore that a study of the most commonly known varieties of mouth preparations might be of value. We therefore examined a number of dentifrices with special reference to the grits and abrasive substances which they contain and their effect when used upon the teeth. In making our report of this portion of our work we wish it to be clearly understood that the work which we have done or the report of same is not made with the intention of condemning or discriminating against any one or any group of these preparations. Our purpose is rather that of classifying their action upon the teeth in order that they may be more intelligently prescribed by the profession.

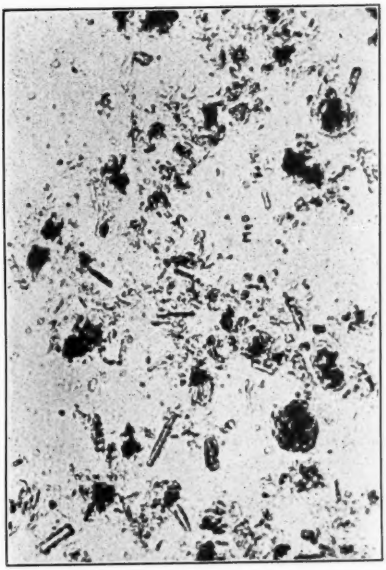
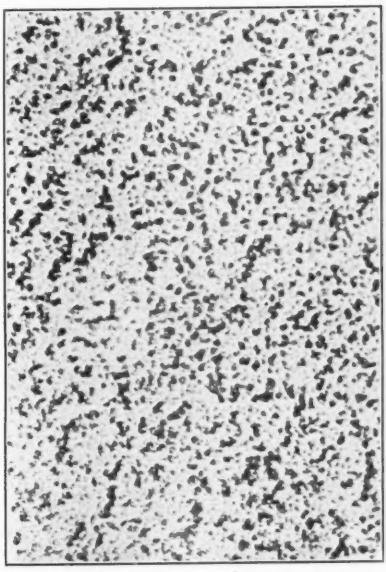


Fig. 9. Magnesium Oxide.



Precipitated Chalk. Fig. 11.

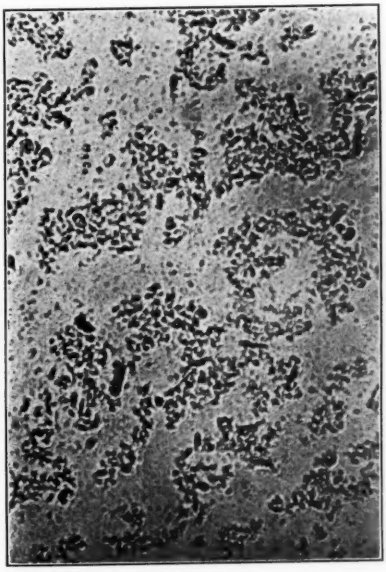
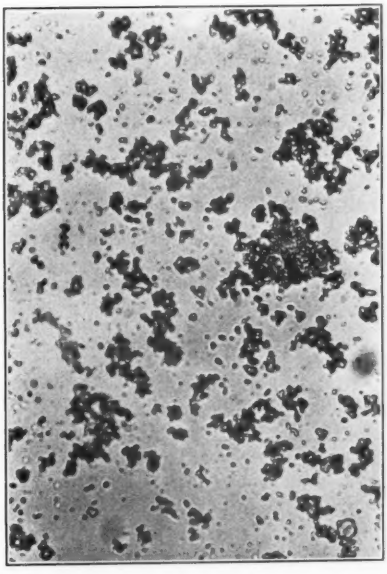


Fig. 10 Magnesium Carbonate.



Prepared Chalk. Fig. 12.

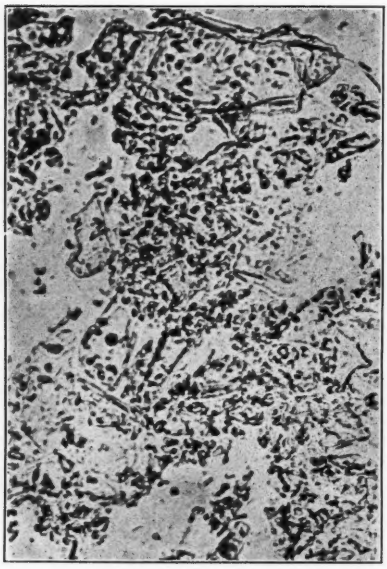
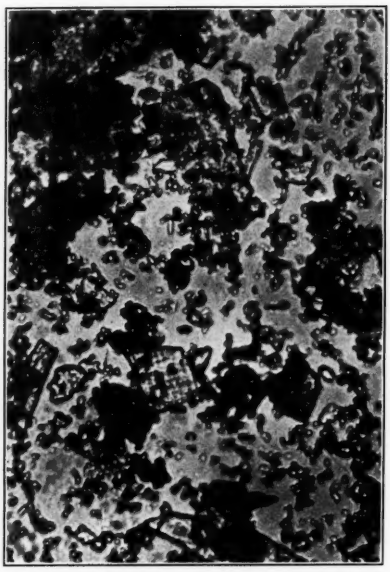
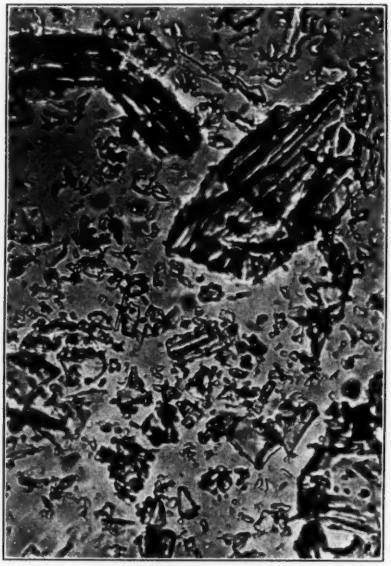


Fig. 13. French Chalk.



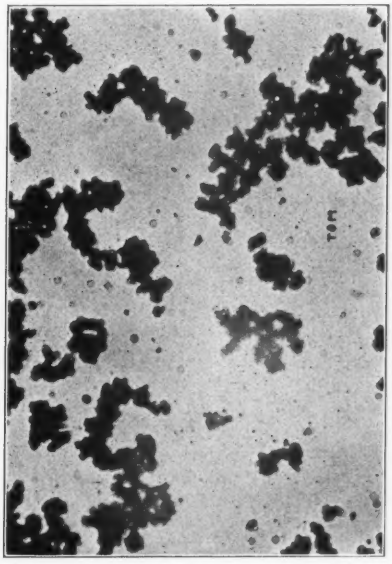
Cuttle Fish. Fig. 15.

Fig. 14. Talc.



Pumice Stone (Stock). Fig. 16.

Fig. 17. Pumice Stone (B. D. Mfg. Co.)



Tin Oxide (Merck). Fig. 19.

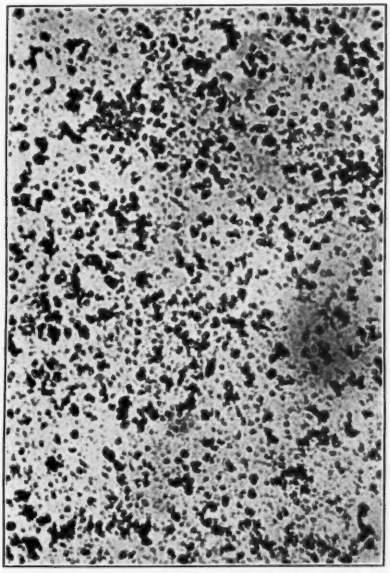
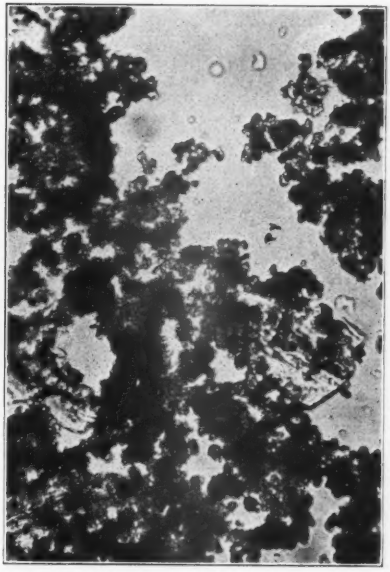


Fig. 18. Tin Oxide (Stock).



Pyorrhocide. Fig. 20.

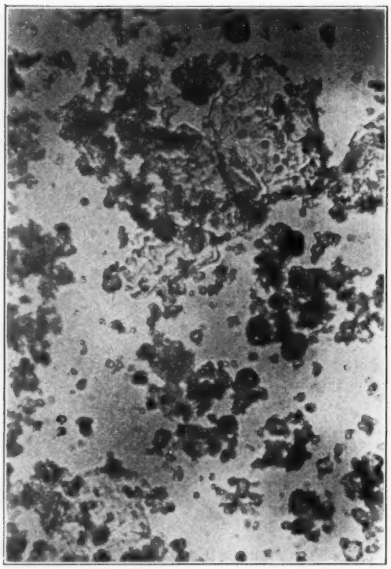
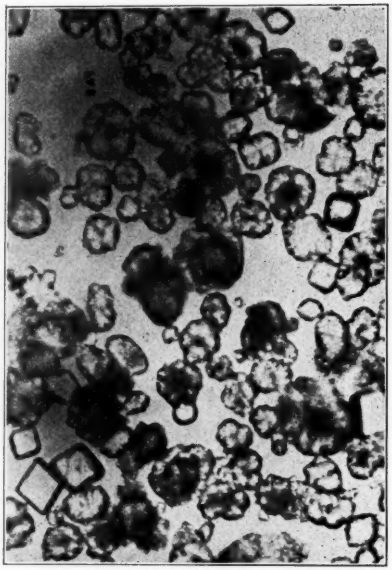


Fig. 21. Graves.



Lyons. Fig. 23.

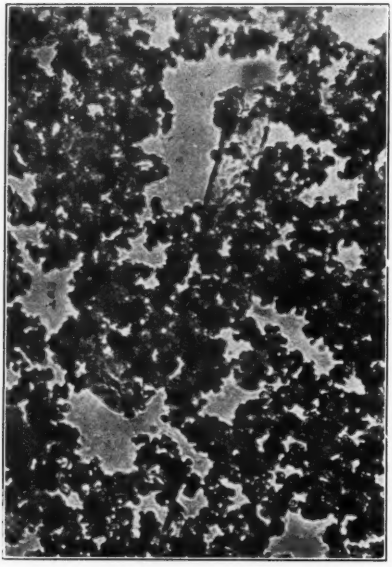
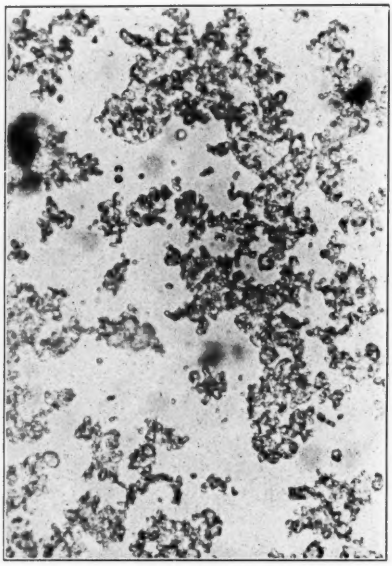


Fig. 22. Euthymol.



Colgate. Fig. 24.

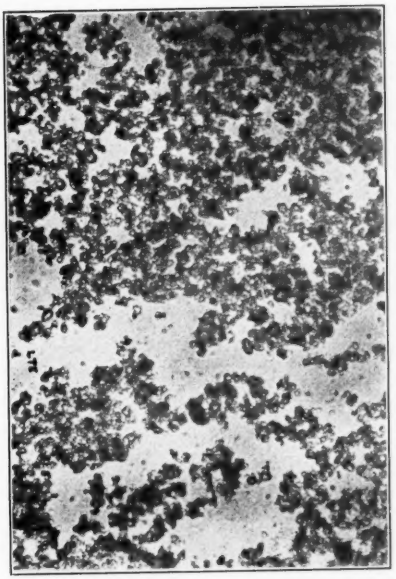
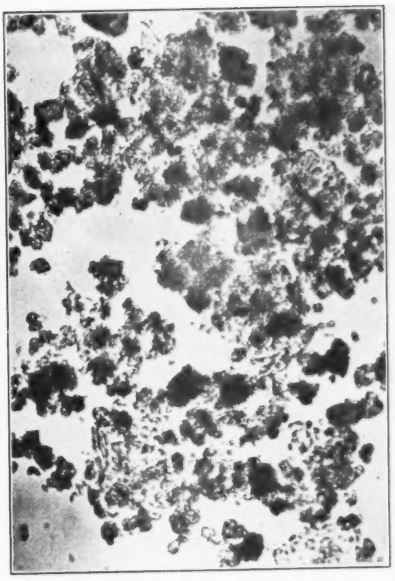


Fig. 25. Listerine.



Kolynos. Fig. 27.

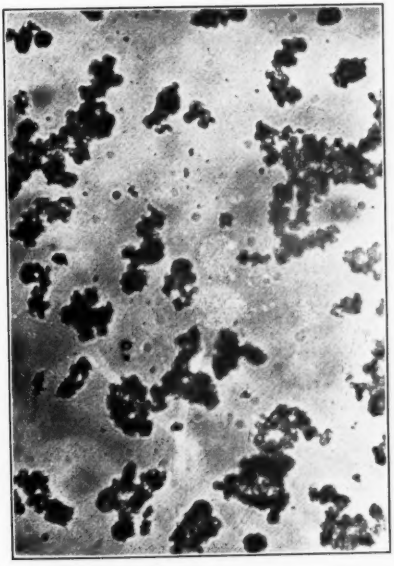
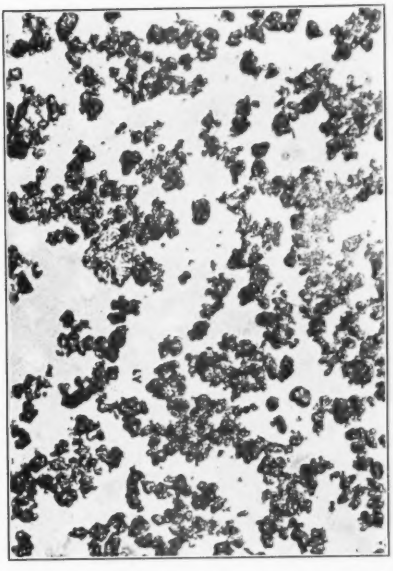


Fig. 26. Calex.



Lilly. Fig. 28.

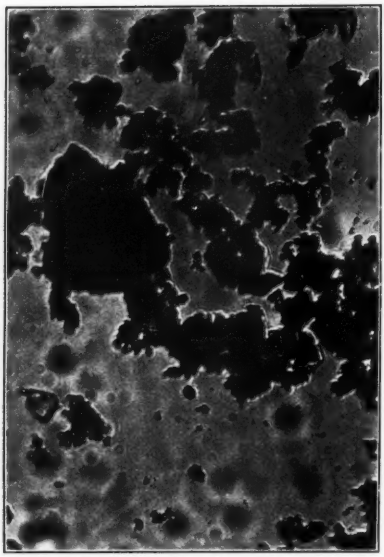
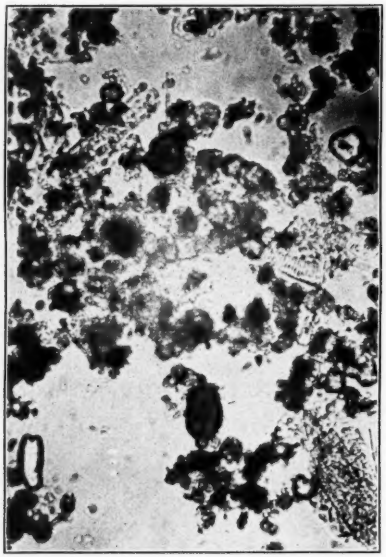


Fig. 29. Hutax.



Sozodont. Fig. 31.

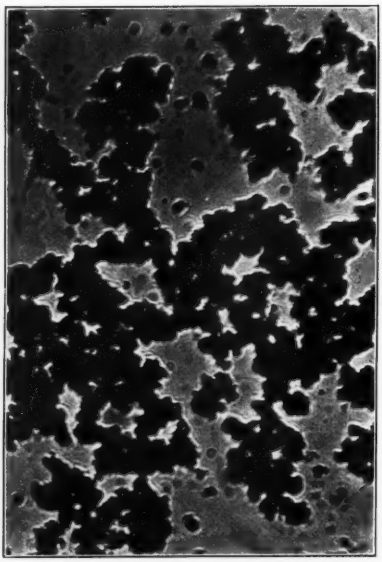
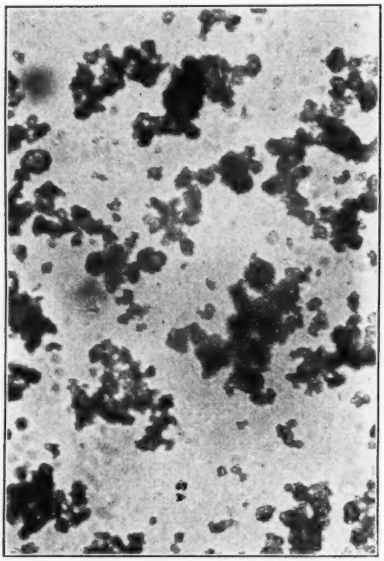


Fig. 30. Pebeco.



Sanitol. Fig. 32.

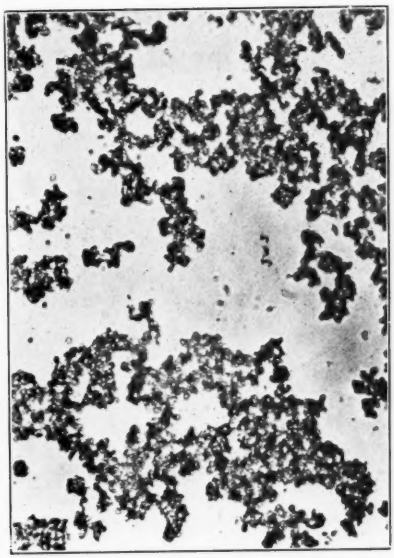
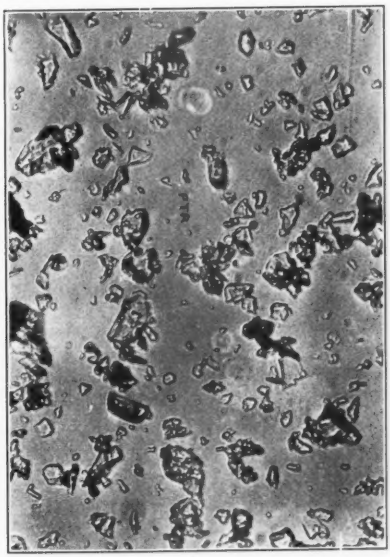


Fig. 33. J. W. Jungman Formula No. 3.



Politor. Fig. 35.

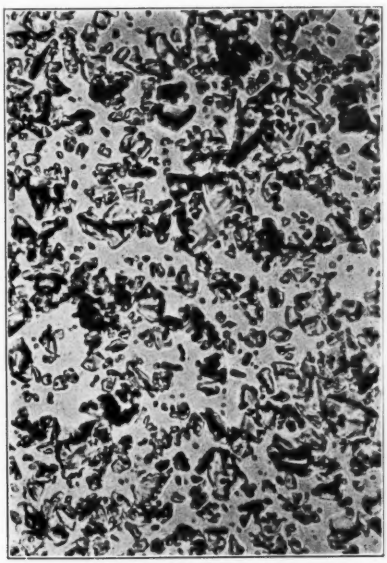
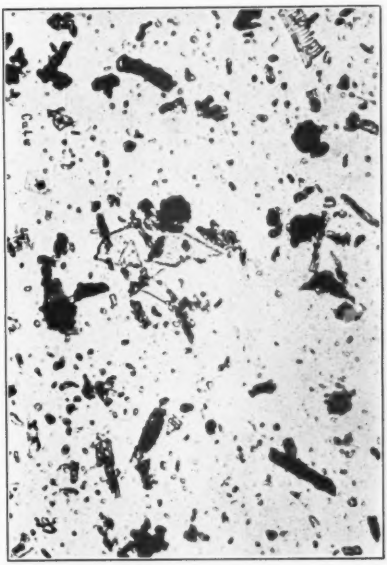


Fig. 34. Carmi Cleaner.



Carmi Lustra. Fig. 36.

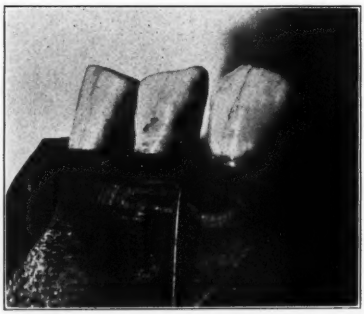


Fig. 37.

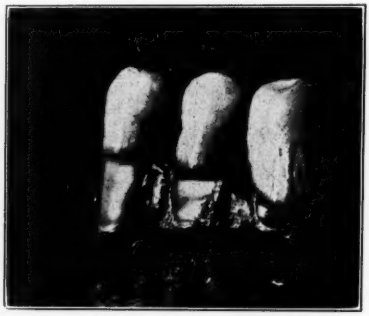


Fig. 40.

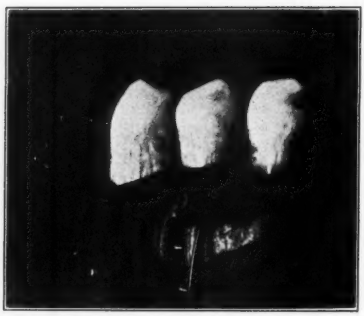


Fig. 38.

Fig. 41.

Fig. 39.

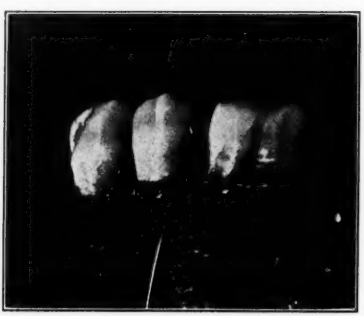


Fig. 42.

In the pursuit of this investigation we made micro-photographs of the grits commonly used in tooth powders and pastes and also combinations as found in a number of proprietary preparations. In the process of making these photographs, each powder or paste was shaken up in an excess of water, allowed to stand for about ten minutes and then filtered. The residue was then dried and mounted as for microscopical examination. The degree of enlargement is alike in all specimens, being 400 diameters.

Figures 9 to 19 inclusive include many of the abrasives commonly used, of which the most common is precipitated chalk. There are many grades and qualities of this substance, many of which contain impurities and foreign matter but the better grades have the appearance of fine round amorphous particles of uniform size. Figs. 13 and 14 show the similarity and identity of the so-called French chalk and Talc. There are many mouth preparations which appear to contain Talc in the form of thin plates of considerable size, and which because of their sharpness make them rapid cutters. Cuttle Fish and Pumice Stone are not being used by many manufacturers at the present time altho there are a few preparations on the market which still contain them. Two samples of Pumice Stone are shown in Figs. 16 and 17 for the purpose of comparing the product of the Buffalo Dental Mfg. Co. with that of ordinary stock pumice. Tin Oxide which is largely used in tooth powders to produce a high lustre to the teeth, is found on the market in several different forms. We show two varieties, Figs. 18 and 19, one a sample bought on the market out of stock and the other a preparation made by Merck. It is claimed that this latter preparation is a better polisher than some other forms, which may be accounted for by the fact that it readily absorbes water, as seen in the cut, and the individual particles swell up, giving the whole mass a sticky and pasty consistency, which would be expected to be a better polishing agent than the harder varieties.

In the consideration of the proprietary preparations samples were taken from stock packages of each, and an attempt was made to select a portion for our picture which was as typical of the whole as possible. We recognize the fact that it is difficult to judge a whole product by a small sample as the mixture of ingredients may vary in different batches or even in two ends of the same can. In our examination we detected certain gross differences in these preparations and have attempted to obtain a true and intelligent record of each. Of the powders and pastes which were examined those which contained the coarser forms of abrasives are Pyorrhocide, Lyons Sozodont and Sanitol as shown in Figs. 20, 23, 31, and 32. Of these, Pyorrhocide contains a relatively large amount of a coarse heavy crystaline substance, two particles of which may be seen in the cut. These large substances are imbedded in a filler of a fine powder which seems to be somewhat hydroscopic. There is no evidence of soap as it does not foam on shaking with water.

Lyons contains a definite prismatic crystal with sharp corners. The filler consists of large round substances of irregular shape, which respond to the test for starch.

Among the finer powders Euthymol, Fig. 22 has a much smaller amount of sharp material than the last two, with a filler that is quite hydroscopic and an abundance of soap, while Graves, Fig. 21, contains a considerable proportion of a finer grit incorporated with granules of starch and has little soap.

Colgate, Listerine, Kolynos, Calox, Lilly, Hutax, and Pebeco, as shown in Figs. 24 to 30 are largely composed of fine grits, some of which resemble precipitated chalk and tin oxide. Many of the illustrations are misleading in their

appearance because of the marked hydroscopic property of their particles which cause them to swell up and clump together so that they appear larger than some of the other varieties which are less hydroscopic. This is true in the cases of Hutax and Pebeco. Many of these preparations contain a high percentage of soap. This is especially true of the pastes. Those which contain little or no soap are Pyorrhocide, Graves, Calox and Listerine.

One non-proprietary preparation was examined, which was made after a formula suggested by Dr. J. W. Jungman of Cleveland. It is a powder and was made according to the following formula:

Pulv. Castile Soap	Parts ¾
Sacch. Alba Pulv.	" 1
Oxide Tin (Mercks)	" 3
Creata Precip.	" 12
Flavor Q. S.	

Fig. 33 made from such a powder shows plainly the precipitated chalk and some evidence of the hydroscopic tin oxide.

Figs. 34 to 36 are similar magnification of three products which are made use of by prophylaxis operators in polishing the teeth. It will be seen that both Carmi-Cleaner and Politor are largely composed of sharp particles which resemble ground silica. They are, however, quite even in their size and much smaller than those which are found in the ordinary forms of pumice stone. Carmi-Lustra is designed as a fine polishing powder but contains a considerable amount of small sharp crystaline like substances which is imbedded in a fine hydroscopic filler.

It must be clearly understood that in a comparative study of a number of preparations such as have been considered, it is not possible to judge of the cutting or abrasive qualities of each by the size and form of their grits alone. It will be found that the cutting properties are influenced by the hardness and sharpness of the particles as much or more than by their size. So that it is possible for a powder having small sharp particles to cut with greater rapidity than one containing large masses. The amount of soap which such preparations contain is also a factor of great importance. For instance, by the use of talc and water on the end of the finger, one may quite easily remove the glaze from a pane of glass. But if the talc be mixt with an equal amount of powdered soap such as is used in tooth powders, it is extremely difficult to make an impression on the surface of the glass in this manner. So that it becomes evident that a large amount of soap in a dentifrice by its tendency to foam will envelope and cover up the particles of grit, thus partially or wholly preventing their action when used on the brush.

For the purpose of estimating the effect of certain dentifrices the following experiment was made. Six specimens were prepared each consisting of three perfect teeth, arranged as in the jaw and mounted in modeling compound which was carved to simulate the gums and gingival tissues. Modeling compound caps were then fitted over the incisal third of the tooth leaving the middle and gingival thirds uncovered. These sets of teeth were then brushed in a crosswise manner with a medium size tooth brush, using a different preparation in each case. They were each given 10,000 double strokes, which on the basis of 10 such strokes per day would represent the work done in about three years of use. It was recognized that this form of brushing was not ideal or proper, but was alike in all cases and not dissimilar to that which has very common acceptance among a large proportion of the public today. It must also be admitted that the work was done without the influence of mucinous material which would naturally accumulate upon the teeth from time to time, and which would tend to diminish the abrasive action of the dentifrice. But in each case saliva was used as a lubricant and diluent of the paste or powder to be tested.

The first one of this series was brushed

with water and brush alone. The result, as seen in Fig. 37, was a thoro cleansing of the tooth and a slight amount of wear. A similar test was made with vinegar, ½ strength. The effect as seen in Fig. 38 was to reduce the thickness of the enamel about 1-1000 of an inch by actual measurement. In addition to this it left the surface of the enamel in a corrugated condition as shown in the cut, which seemed to indicate an uneven decalcification of the enamel. As a further test of the action of vinegar we subjected one-half of a tooth to vinegar one-half strength for 30 minutes, at the end of which time it, together with its control were put thru the silver nitrate test. This was done with several teeth with the result in each case that the silver penetrated to a greater depth and to a considerably greater amount in the case of the half which was treated with vinegar. We do not claim that these are conclusive evidence but we feel that there is reason to believe that vinegar in ½ strength will have a decalcifying action upon the enamel of the teeth and aid in its being worn away by the brush.

The next specimen as shown in Fig. 39 was brushed with one of the pastes containing a fine grit. It did not seem to clean the teeth as well as did the water or vinegar, but rather gave them a smeary and yellowish appearance. The result obtained was far from satisfactory.

Figs. 40 and 41 were of teeth brushed with abrasive preparations which resulted in the cutting of deep grooves thru the enamel and into the dentin. They both bore a striking resemblance to the cases of severe "tooth-brush erosion" which are frequently seen in the mouth. The former of these which contained a coarse grit cleaned the teeth without polishing, leaving a dull surface, while the latter which had a fine grit gave the enamel a high polish and a white appearance.

The last of these series was made with the Dr. Jungman formula given above. The teeth as shown in Fig. 42 show no wear but have taken on a high polish which is probably due to the tin oxide which it contains.

In concluding this work we feel that dentists should make a more close study of the properties of dentifrices which they are prescribing, and also the needs of the mouths in which they are to be used. In cases in which the saliva is viscous and deposits form upon the teeth with great rapidity making it difficult to keep the mouth clean, then a more abrasive dentifrice might be used to advantage. But in those cases in which the saliva is thin and the deposits few, an abrasive powder or paste is clearly not indicated. Rather should a fine and hydroscopic preparation be employed which will polish and clean the teeth without wear. The results which we have obtained serve also to call attention again to the importance of brushing the teeth in a vertical rather than a horizontal manner. Especially is this true in the case of the sharp preparations, which would have produced no such pronounced results as seen in the experiment had they been brushed lengthwise of the teeth. Let us then teach the people how to properly brush their teeth and then advise them as to the particular dentifrice which best suits their needs.

CONCLUSIONS.

The density of the external enamel surface of the teeth is capable of change.

This change may be co-incident with the changes in bodily health and the calcium content of the saliva.

A consolidation of the enamel surface may be induced by continued polishing and rubbing in prophylactic treatment extended over a considerable space of time.

Results so far obtained warrant a further study and investigation of the calcium content of the saliva in its relation to the condition of tooth tissues and their susceptibility to dental caries.

THE DENTAL DEPARTMENT OF THE AMERICAN HOSPITAL.

By Herbert L. Wheeler, New York City.

LETTERS from American dentists who are doing such noble work for humanity, at the American Hospital of Paris reminds us that a few words telling of the efforts of such men as Drs. Geo. Hayes, W. B. Davenport, Isaac Davenport, of Paris, D. O. M. LeCron and C. W. Roberts of London, and others may be of interest to their colleagues in America who are members of the N. D. A.

This hospital was organized with a dental service under the direction of Drs. Hayes and Davenport at the beginning of the war. Under their skillful guidance the dental department began immediately to make its usefulness felt. Supported entirely by voluntary donations from Americans, its service for fractured jaw cases and kindred injuries is not excelled by any hospital in Europe.

Those serving there give their services and support themselves. An object lesson of the willingness of the American to sacrifice both time and money in the cause of his profession when occasion requires it.

With the settling down of the conflict on its western arena, to a system of trench warfare it has been discovered that a large number of those who are wounded in the trenches are shot in the left arm or in the face or jaw. This has increased the demand for dental service far beyond the ability of the available number of dentists to cope with it.

The work of the dental department of the American Hospital of Paris has been of such a character that ten other hospitals in Paris have made application to send Jaw Cases to this dental department.

The service was started with one chair, there are now six and six more are to be put in in order to meet the demands made upon it.

These American dentists who are carrying on this noble work are giving their time, while their practise is being neglected. They are not only doing a great service for humanity, they are at their own personal expense, contributing to keep up the standard and reputation of American dentistry abroad.

For this every dentist in America should feel a deep sense of gratitude.

Let us show our appreciation by contributing of our means to help keep up this service.

Last winter the First District Dental Society of New York City, instead of holding its annual banquet, gave a reception at which admission was charged, and the proceeds, some $300.00, was sent to this hospital in Paris.

Money for the dental service should be sent:

For the Dental Department,
American Hospital of Paris,
Ambulance Lycee, Boulevard d' Inkerman,
Neuilly Sur Seine, Paris, France.

Unless specified especially, red cross funds do not reach the Dental Department.

PROGRAM PANAMA-PACIFIC DENTAL CONGRESS.

San Francisco, Cal., August 29 to September 9, 1915.

(This is only a partial list of the papers, essayists and clinicians.)

The Evolution and Development of the Mandible.
By Martin Dewey, D. D. S., M. D.....Kansas City, Mo.

Anomalies in Dental Pulp Structures and their Relation to Clinical Work.
By Dr. V. A. Latham.....Chicago, Ill.

Research on the Resistance of the Red Corpuscles of the Blood of the Human Gums (normal and pathological) to the Diluted Salt Solutions.
By Prof. Anigo Piperno.....Rome, Italy

A Brief Synopsis of a Paper Entitled An Investigation of Mottled Teeth; an endemis affection not heretofore known.
By Dr. Fred S. McKay, of Colorado, in Collaboration with Dr. G. V. Black,
.....Chicago, Ill.

The Value of Bacterial Vaccines in the Treatment of Pyorrhea.
By Dr. Geo. B. Harris.....Detroit, Mich.

Radiograph in Dentistry and Orthodontia.
By. Drs. Brownlie and Ketcham.....Chicago, Ill.

The Etiology of Dental Abscesses, Acute and Chronic.
By Thos. B. Hartzell.....Minneapolis, Minn.

Acidemetris Study of the Saliva and Its Relation to Diet and Caries.
By John S. Marshall.....San Francisco, Cal.

An Investigation of the Character of the Various Dental Cements.
By Dr. Marcus L. Ward.....Ann Arbor, Mich.

Some Regractory Materials Used in Dentistry.
By Dr. Guy Stillman Millberry.....San Francisco

Report on Dental Clinical Work in the Hospitals, Schools and Prisons in Manila, P. I.
By Lewis Ottofy, D. D. S.....Manila, P. I.

The Educational Value of Oral Hygiene in the Army.
By Dr. Edwin P. Tignor.....United States Army

The Agencies in Ohio Co-operating in a General Hygiene Educational Campaign.
By Dr. Homer C. Brown.....Columbus, Ohio.

Hygiene of the Bucco Dental Cavity as an Important Auxiliary for the Prophylaxis of Incipient Bucco-Pulmonary Tuberculosis.
By Dr. Ernesto A. Dam.....Lima, Peru

Bad Root Canal Work—What Shall We Do About It?
By Howard R. Raper, D. D. S.....Indianapolis, Ind.

Pain—Its Significance and Value as a Diagnostic Symptom—Its Advantages and Disadvantages, and the Importance of Its Alleviation and Prevention.
By Dr. E. T. Loeffler.....Ann Arbor, Mich.

Superstitions of Dental Medicine.
By Dr. Garrett Newkeils.....Pasadena, Calif.

Therapeutic and Surgical Treatment of Roots and Their Adjacent Tissues.
By Dr. I. F. Biddle.....Pittsburg, Pa.

The Therapeutic of Radicular and Fallicular Dental Cysts.
By Prof. Dr. Rudolph Weish.....Vienna, Austria

A Few Thoughts on the Comparative Anatomy of the Maxillary Sinus, Its Relation to the Teeth Mandilcular Enticulation and Alimentary System.
By Dr. Matthew H. Cryer.....Philadelphia, Pa.

Radium Treatment of Carcenoma.
By Dr. Oscar Strauss.....Milwaukee, Wis.

A Case of Acromegaly.
By Dr. P. Gaad.....Helsingford, Finland

Etiology and Treatment of Oral Tumors.
By Dr. Fulton Risdon.....Toronto, Canada

What is the Line of Occlusion.
By Dr. R. Ottolengui.....New York, N. Y.

An Attempt Toward Automatic Connection.
By Dr. Sulucana .....Spain

Some Practical Uses in Dental Practice for Tungsten and Molybdenum.
By Dr. W. A. Price.....Cleveland, Ohio

A Method of Surveying and Mapping the Dental Apparatus.
By Dr. F. L. Stanton.....

The Plantation of Teeth.
By M. J. Congdon, D. D. S.....Berkeley, Cal.

Cavity Preparation for Gold Inlays.
By Dr. John Conzett.....Dubuque, Ia.

The Recessional Lines of Pulps in Their Relation to Operative Dentistry.
By Dr. H. G. Chappel.....Oakland, Cal.

Operative Procedures in Relation to Dental Caries and Diseases of the Investing Tissues.
By Arthur D. Black, M. D., D. D. S.....Chicago, Ill.

Anoci-Association in Dental Operations.
By R. H. Reithmuller.....Philadelphia, Pa.

Technics in the Treatment of Pulps, Root Canal and Pericytical Area.
By Dr. M. L. Rhein.....New York, N. Y.

Peridental Anesthesia, Intraosseous Method.
By Dr. Frank L. Platt.....San Francisco, Cal.

The Successful Scientific Treatment of Periodontal Diseases.
By Dr. T. Sydney Smith.....Palo Alto, Cal.

Pyorrhea Alveolaris Showing the Pathological Changes Occurring in the Alveolus Based on Microscopic Observation.
By Dr. Fred Hecker.....Kansas City, Mo.

The Entameba Buccalis as Seen Thru the Microscope Illustrated by Moving Picture Film and Lantern.
By Dr. Geo. H. Neilson.....Cleveland, Ohio

Crown & Bridge.....H. J. Goslee, Chicago

Some Fundamental Things in Dental Prosthesis.
By Dr. J. Leon Williams.....New York, N. Y.

Some Grave Errors in the Practice of Crown and Bridge Work.
By Dr. Vincenzo Guerini.....Naples, Italy

Indications and Construction of a Rubber Obturatoa that is Retained Only by the Action of the Soft Tissues.
By Dr. Calvin S. Case.....Chicago, Ill.

Some Educational Topic.
By Dr. Edw. C. Kiels.....Philadelphia, Pa.

The Development of Dental Service in the Navy.
By Dr. Emory A. Bryant.....U. S. A.

Nomenclature.
By Dr. Arthur D. Black.....Chicago, Ill.

Dental Society Organization.
By Dr. E. S. McCard.....Seattle, Wash.

CLINICIANS.

Dr. Geo. H. Wilson.....Cleveland, Ohio.
Dr. Andrew J. McDonagh.....Toronto, Canada
Dr. J. A. Gardner.....Memphis, Tenn.
Dr. J. P. Buckley.....Chicago, Ill.
Dr. Fred W. Dethro.....Chicago, Ill.
Dr. H. J. Goslee.....Chicago, Ill.
Dr. V. H. Jackson.....New York City
Dr. Wm. A. Capon.....Philadelphia, Pa.
Dr. Frank M. Castro.....Cleveland, Ohio.
Dr. J. Leon Williams.....London, England
Dr. John D. Conzett.....Dubuque, Iowa
Dr. L. P. Haskell.....Chicago, Ill.
Dr. Robin Adair.....Atlanta, Ga.
Dr. Thos. B. Hartzell.....Minneapolis, Minn.
Dr. Arthur E. Peck.....Minneapolis, Minn.
Dr. Edwin R. Kibler.....Indianapolis, Ind.
Dr. J. M. Bischoff.....Stevens Pt., Wis.
Dr. R. A. Day.....San Francisco, Cal.
Dr. C. J. R. Engstrom.....Los Angeles, Cal.
Dr. Richard H. Reithmuller.....Philadelphia, Pa.
Dr. C. F. Fiset.....Seattle, Wash.
Dr. A. H. Ketchan.....Denver, Colo.
Dr. James D. McCoy.....Los Angeles, Cal.
Dr. Robt. Dunn.....San Francisco, Cal.
Dr. Everett M. Heard.....Portland, Ore.
Dr. A. F. Merriman.....Oakland, Cal.
Dr. Allen Suggett.....San Francisco, Cal.
Dr. Fred E. Hart.....San Francisco, Cal.

TRANSACTIONS

OF THE

EIGHTEENTH ANNUAL MEETING OF THE NATIONAL DENTAL ASSOCIATION.

Held at Rochester, N. Y., July 7-10, 1914.

THIRD GENERAL SESSION—JULY 8, 8:30 P. M.*

Session called to order at 8:30 P. M. by President Brown.

THE PRESIDENT: Ladies and Gentlemen, the Third General Session of the National Dental Association will now come to order. In behalf of the Association I wish to express the deep appreciation of the dental profession for the privilege that is ours on this occasion. We have had with us at this meeting Dr. Victor C. Vaughan, the President of the American Medical Association. We are signally honored on this occasion by having with us our honored guest, Dr. Joseph Colt Bloodgood, of Johns Hopkins University. I take great pleasure at this time in presenting to you Dr. Bloodgood (Applause).

DR. BLOODGOOD: Mr. President, Members of the National Dental Association, Ladies and Gentlemen: I assure you that I appreciate this honor and this opportunity to bring before you some conditions that are on the border line between medicine and dentistry. I think you will all agree with me, and the medical world will also, that the dental profession guards, or at least if given an opportunity will guard, one of the most important portals or entrances or gateways thru which disease may enter the human body. I shall discuss tonight chiefly malignant diseases, but perhaps the larger group is the infections which find their way thru the mouth cavity. I shall not speak of your opportunities of preventing those infections, but shall confine myself to tumors or malignant disease. In the same sense, perhaps, you can prevent these diseases.

(Dr. Bloodgood's paper was published in the March issue of The Journal, page 1.)

PRESIDENT: We also are honored tonight to have with us Dr. Grover W. Wende, of Buffalo, N. Y., President of the New York State Medical Society, who will give us a paper on "Oral Manifestations in Syphillis." (Applause.)

(Paper will appear in later issue.)

Session adjourned.

*The First and Second General Sessions were published in the October Official Bulletin, Pages 124-134.

FOURTH GENERAL SESSION—THURSDAY, 8:00 P. M.

The Fourth General Session was called to order Thursday, July 9th, at 8 P. M. by Dr. Henry A. Kelley, Portland, Me., chairman of Section I.

THE CHAIRMAN: The first paper this evening will be on "A Study of Root Canal Filling Materials," by Dr. J. R. Callahan, Cincinnati, Ohio.

(This paper will appear in a later issue of the Journal.)

THE CHAIRMAN: The next paper will be, "Technic for Making Impressions and Models for the Construction of Artificial Dentures." Demonstrated with motion pictures, by Dr. William A. Giffin, Detroit, Mich.

(Dr. Giffin's paper will appear in a later issue of The Journal.)

Dr. Frank L. Platt, of San Francisco, chairman of the Panama-Pacific Dental Congress Committee on Organization, was introduced and gave an illustrated talk on the Panama-Pacific Exposition Grounds, place where the Dental Congress will be held in 1915.

The fourth general session then adjourned.

FIFTH GENERAL SESSION—THURSDAY, 4:00 P. M.

The general session was called to order Thursday, July 9th at 4 P. M., by the president, Dr. Brown.

The first order of business as announced by the president was the installation of the newly elected officers.

The following officers were then duly installed: President, Donald Mackay Gallie, Suite 1012, Reliance Bldg., Chicago, Ill.; First Vice-President, Edward G. Link, 226 Cutler Bldg., Rochester, N. Y.; Second Vice-President, L. P. Dotterer, 102 Broad St., Charleston, S. C.; Third Vice-President, *T. E. Turner, St. Louis, Mo.; General Secretary, Otto U. King, Huntington, Indiana; Treasurer, *H. B. McFadden, Philadelphia, Pa.

Motion was then made and carried that the National Dental Association adjourn to meet in conjunction with the Panama-Pacific Dental Congress in San Francisco, Aug. 30, to Sept. 9, 1915.

*Deceased.

The Board of Trustees met in Chicago on February 27th, 1915, and elected Dr. Arthur R. Melendy Treasurer, Knoxville, Tennessee, to fill the unexpired term of Dr. H. B. McFadden. Dr. Clarence V. Watts, Des Moines, Iowa, was elected Third Vice-President, to fill the unexpired term of Dr. T. E. Turner.

SECTION PROCEEDINGS.

SECTION I.

Operative Dentistry, Nomenclature, Literature, Dental Education and Allied Subjects.

Chairman—Henry A. Kelley, Portland, Me.
Vice-Chairman—Frank Holland, Atlanta, Ga.
Secretary—H. E. Friesell, Pittsburg, Pa.

TUESDAY—First Session.

The first session of Section I was called to order Tuesday, July 7th, at 2 P. M., by the chairman, Dr. Henry A. Kelley, Portland, Me.

THE CHAIRMAN: Because of difficulty in arranging for the stereopticon slides in this room, the Essay of Dr. E. J. Eisen will be postponed until Thursday morning, and we will now take up the paper of Dr. Herbert L. Wheeler, of

New York City, on "Dental Literature, Its Past and Present." (Applause).

(Dr. Wheeler's paper will be published in a later issue of The Journal.)

THE CHAIRMAN: The reading of Dr. Eisen's paper will be postponed until Thursday, at 12 o'clock.

THE CHAIRMAN: The next session of this Section is to be held on Thursday, at 9:30 A. M.

Adjournment.

THURSDAY—Second Session.

The second session of Section I was called to order by the chairman, Dr. Henry A. Kelley, at 9:30 A. M., Thursday, July 9th.

THE CHAIRMAN: Our subject this morning is "Possibility of the Elimination of Pain from Dental Operations." This is a symposium.

(a) "General Anesthesia and Analgesia by Somnoform," by Dr. W. H. DeFord, Des Moines, Iowa.

(b) "General Anesthesia and Analgesia by Nitrous Oxide and Oxygen," by Dr. J. P. Henahan, Cleveland, Ohio.

(c) "Local Anesthesia of the Oral Cavity," by Dr. Kurt H. Thoma, Boston, Mass.

(d) "High Pressure Anesthesia," by Dr. W. T. Jackman, Cleveland, Ohio.

(This symposium published in this issue of The Journal, pages 193-208.)

THE CHAIRMAN: This section will now proceed to the election of its officers. The result of the election was as follows: Chairman, H. E. Friesell, 1206 Highland Bldg., Pittsburg, Pa.; Vice-Chairman, E. G. Coolidge, 59 E. Madison St., Chicago, Ill.; Secretary, DeLos L. Hill, Suite 610-12 Grant Bldg., Atlanta, Ga.

THE CHAIRMAN: By special arrangement, we will now adjourn to Assembly Hall No. 1, and take up the paper of Dr. Eisen on "Dental Radiography," which paper was postponed from the Tuesday afternoon session of this Section.

Adjourned.

THURSDAY—Second Session Continued.

The third session of Section I was called to order by the chairman, Dr. Henry A. Kelley, at 12 o'clock, Thursday, July 9th.

The first order of business as announced by the chairman was the reading of a paper by Dr. E. J. Eisen, Milwaukee, Wis., entitled "Interpretation of Dental Radiography."

(Dr. Eisen's paper was published in May issue of The Journal, page 83.)

THE CHAIRMAN: We should elect at this time a delegate from this Section to the House of Delegates.

Dr. John F. Biddle, Pittsburg, Pa., was nominated and elected to serve as the delegate from Section I in the House of Delegates.

THE CHAIRMAN: This section will now stand adjourned.

SECTION II.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Prophylaxis, Oral Hygiene, Materia Medica and Allied Subjects.

Chairman—Carl D. Lucas, Indianapolis, Ind.
Vice-Chairman—W. A. Dean, Tampa, Fla.
Secretary—M. E. Vance, Lincoln, Neb.

WEDNESDAY—First Session.

Dr. Carl D. Lucas, of Indianapolis, Indiana, acted as chairman of the section and Dr. M. E. Vance, of Lincoln, Neb., secretary.

The session was called to order at 2 P. M. by the chairman.

THE CHAIRMAN: The officers of the Second Section of the National Dental Association, have gladly performed their duties according to their best abilities, and feel sure that the Members of the Association, here assembled, fully appreciate the high standard they have set in the securing of the Essayist and Respondants for this section of the program.

Therefore, it affords me great pleasure to introduce our first speaker, Dr. John Deans Patterson, of Kansas City, Mo., who will present the subject, "Pyorrhea Alveolaris, and Comments upon the Vaccine Treatment."

(Dr. Patterson's paper published in this issue of The Journal, page 234.)

THE CHAIRMAN: We have listened to a very timely and valuable paper upon an all-important subject, and in order to follow in sequence, another phase of Oral Prophylaxis will now be presented.

It is my pleasure to introduce to this Assembly, Dr. Charles H. Oakman, of Detroit, Mich., member of The Detroit Board of Health, who will present the subject, "Oral Hygiene."

(Dr. Oakman's paper, with discussion was published in March issue, page 20.)

THE CHAIRMAN: This completes the program for this session, and we will now adjourn.

THURSDAY—Second Session.

The second session of Section II was called to order at 2 P. M. Thursday July 9, by the chairman, Dr. Carl D. Lucas.

THE CHAIRMAN announced that according to the constitution and by-laws the next order of business was the election of a chairman, vice-chairman and secretary for Section II.

The result of the election was as follows: Chairman, Charles J. Lyons, Ann Arbor, Mich.; Vice-Chairman, F. P. Moorehead, People's Gas Bldg., Chicago, Ill.; Secretary, Mark E. Vance, Fraternity Bldg., Lincoln, Neb.

THE CHAIRMAN then introduced Dr. Chalmers J. Lyons, Ann Arbor, Mich., who read his paper entitled "The Pathological Significance of Impacted Teeth."

(Dr. Lyons' paper will be published in a later issue of The Journal.)

The next order of business was the reading of a paper by Dr. M. T. Barrett, Philadelphia, Pa., entitled "The Relation of Protozoa of the Mouth to Alveolar Pyorrhea."

(Dr. Barrett's paper will appear in a later issue of The Journal.)

Section II then adjourned.

SECTION III.

Prosthodontia, Orthodontia, Metallurgy, Chemistry and Allied Subjects.

Chairman—Charles R. Turner, Philadelphia, Pa.
Vice-Chairman—L. E. Custer, Dayton, Ohio.
Secretary—W. Ernest Walker, New Orleans, La.

TUESDAY—First Session.

Assembly Hall No. 2.

The first session of Section III was called to order by Vice Chairman, Dr. L. E. Custer, of Dayton, Ohio, Tuesday, July 7th, at 2 P. M. Dr. W. Ernest Walker, of New Orleans, La., acted as secretary.

The first order of business as announced by the chairman was the reading of a paper by Dr. Dayton Dunbar Campbell, Kansas City, Mo., the title of his paper being "Some Basic Principles and Methods in the Reproduction of Mandibular Movements."

DR. CAMPBELL: Mr. Chairman and Members of the National Dental Association: Only about one per cent of the dental profession care about prosthetic work, and I am gratified to see so many here this afternoon, because I take it you want to know something about how to make better plates.

The first slide bears the likeness of Dr. Gysi, one of the greatest of instrument makers. He seems to have been born with a certain mechanical instinct that was well adapted to the work he was to follow thru life, the making of instruments to secure the proper reproduction of mandibular movements. He is a mechanical genius, but he is keenly æsthetic also, and a humorist when you are able to discover that side of him. The next slide is the picture of Dr. George Henry Wilson, a man to whom I am indebted and grateful for many of the things I shall say in this paper.

(This paper will be published in a future issue of The Journal of the National Dental Association.)

THE SECRETARY: We will next have a paper by Dr. Alden J. Bush, of Columbus, Ohio, on "Proposed Classification of Fixed Bridgework, with Law Governing its Application."

(See paper on page 221 of The Journal.)

Section III then adjourned until Thursday at 9:30 A. M.

THURSDAY—Second Session.

The second session of Section III was called to order by the Vice Chairman, Dr. L. E. Custer, Dayton, O., at 9:30 A. M., Thursday, July 9th.

The first order of business as announced by the chairman was the reading of a paper by Dr. Carl B. Case, Milwaukee, Wis., entitled "Evolution of Bodily Movement of Teeth."

(This paper will appear in a later issue of The Journal.)

THE CHAIRMAN: The next paper on the program is one by Dr. Jules J. Sarrazin, of New Orleans, on the subject: "Properly Constructed Bridges and their Hygienic Care." Dr. Sarrazin. (Applause).

(This paper will be published in a later issue of The Journal.)

The following officers were elected: Chairman, C. W. Mills, Chillicothe, Ohio; Vice-Chairman, L. E. Custer, 28 North Ludlow St., Dayton, Ohio; Secretary, B. L. Shobe, Tulsa, Oklahoma.

Section III then adjourned.

STATE SOCIETY OFFICERS' SECTION.

WEDNESDAY, JULY 8, 2:00 P. M.

Chairman—C. R. Lawrence, Enid, Okla.
Vice-Chairman—Benjamin Sandy, Minneapolis, Minn.
Secretary—A. P. Burkhart, Auburn, N. Y.

WEDNESDAY—First Session.

The first session of the State Society Officers' Section was called to order on Wednesday, July 8th, at 2 P. M., by the vice-chairman, Dr. Benjamin Sandy, of Minneapolis, Minn. Dr. Sandy, in calling the meeting to order, said:

I believe it unnecessary at this time to dwell upon the importance of dental organizations, local, state and national, All great movements in the past have been fostered by these organizations and thru them the profession has been cemented together. We must never-theless admit that there are many evils and weaknesses in the present form of dental organizations. This is shown by the fact that in some of our state organizations, where, with one exception, I believe, the percentage of members to those eligible ranges from 15 to 60 per cent, when it should be 95 or 98 per cent. We should not have men with no executive training occupying for the first time positions of importance in the organizations, learning by experience rather than by training. These conditions are the excuse for the existence of this section. We have with us today men who have given a great deal of time and thought to these conditions, men who are past as well as present masters on the subject of organization work, and I take great pleasure in calling upon our president, Dr. Homer C. Brown, Columbus, Ohio., who will now read his paper entitled, "The Responsibilities of the State Society Officers." (Applause.)

(Dr. Brown's paper was published in May number of The Journal, page 101.)

THE CHAIRMAN then introduced Dr. Arthur D. Black, of Chicago, Ill., who read his paper entitled "The Conduct of State Societies and Their Components, in the Planning of Programs and Administration."

(Dr. Black's paper was published in May number of The Journal, page 110.)

The session then adjourned until Thursday, July 9th, at 2 P. M.

THURSDAY—Second Session.

The second session of the State Society Officers' Section was called to order on Thursday, July 9th, at 2 P. M. by the vice-chairman, Dr. Benjamin Sandy.

THE CHAIRMAN: The first thing on our program for this afternoon is a paper on "A State Society's Aim; Making Efficient Dentists," by Dr. Otto U. King, of Huntington, Indiana, General Secretary of the National Dental Association. (Applause.)

(Dr. King's paper will be published in a later issue of the Journal.)

THE CHAIRMAN: I regret to say that Dr. Price has been called home by the serious illness of his son, and his paper will not be read. This closes the program of this section at this time.

THE CHAIRMAN: The next order of business is the election of officers for the Section.

The election of officers resulted as follows: Chairman, Benjamin Sandy, Syndicate Bldg., Minneapolis, Minn; Vice-Chairman, C. R. Lawrence, Enid, Oklahoma; A. P. Burkhart, Secretary, 53 Genessee St., Auburn, N. Y.

There being no further business this State Society Officers' section adjourned.

REPORT OF THE TREASURER OF THE NATIONAL DENTAL ASSOCIATION, JULY 2, 1914, to FEB. 1, 1915.*

July, 1914, to Jan. 1, 1915.

Receipts.

1914			
July 2,	Balance in Centennial Nat'l Bank.		$2807 14
July 6,	Otto U. King, Huntington, Ind.		1585 17
July 7,	Otto U. King, Huntington, Ind.		970 03
Sept. 7,	Otto U. King, Huntington, Ind.		1400 00
Sept. 7,	L. M. Weaver, Dues 1913		5 00
July 7,	Ellen R. Carr, Dues 1912-1913		10 00
Oct. 1,	W. P. Smith, Dues 1913		5 00
Oct. 1,	Otto U. King, $1.70 Returned on Bond, $24.00 due		25 70
Oct. 16,	Otto U. King		900 00
Nov. 5,	Otto U. King		812 30
Nov. 25,	Otto U. King		4 00
Nov. 18,	——— Winker, dues 1912-1913		10 00
Dec. 1,	Otto U. King, $24.00, $7.00, $10.00.		41 00
Dec. 3,	Otto U. King		25 00
Dec. 12,	R. H. Jones, Winston Salem, dues 1913		3 00
Dec. 14,	Robt. T. Oliver, U. S. A., dues 1913		5 00
Dec. 14,	Otto U. King		59 00
Dec. 26,	Otto U. King		68 00
July 7,	Southern Dues		7 00
Aug. 14,	Check		190 00
	Total receipts		$8932.34

Disbursements.

1914			
	July 10, Burton Lee Thorpe		53 04
	July 10, Homer C. Brown		303 28
	July 27, Homer C. Brown		50 20
20	July 27, Otto U. King		1200 00
27	July 27, Whitelock Press		1681 73
21	July 27, Otto U. King		50 00
23	July 27. C. P. Laurence		3 20
24	July 27, J. V. Conzett		177 31
26	July 27, H. B. McFadden		24 73
28	July 27, H. B. McFadden		200 00
31	July 27, Jos. C. Bloodgood		29 25
32	July 27, Edgar M. Carson		7 00
33	July 27, Gerald G. Burns		30 53
34	July 27, Central Law Reporting Co.		250 00
25	Aug. 6, S. S. White Dental Mfg. Co.		462 43
36	Aug. 6, Victor C. Vaughan		25 00
35	Aug. 6, Wm. Crenshaw		304 10
37	Sept. 5, Carl D. Lucas		13 57
38	Sept. 5, Arthur D. Black		10 00
22	Sept. 11, Otto U. King		1059 70
40	Sept. 11, Otto U. King		320 00
43	Nov. 6, Clinton G. Fish		58 00
42	Nov. 2, Otto U. King		829 62
41	Nov. 2, Otto U. King		320 00
39	July 10, Fidelity & Deposit Co., Md.		40 00
44	Dec. 1, Otto U. King		160 00
	Lincoln National Bank		19 00
	Total disbursements		$7852 69
	Receipts		$8932 34
	Disbursements		7852 69
	Balance Dec. 31, 1914		$1079 65

Receipts.

1915			
	Balance Dec. 31, 1914		$1079 65
Jan. 2,	Otto U. King		398 63
Jan. 8,	Otto U. King		2007 00
	Total receipts		$3485 28

Disbursements.

1915			
48	Jan. 4, R. L. Polk Co		5 00
46	Jan. 4, Otto U. King		160 00
47	Jan. 4, Otto U. King		449 23
48	Jan. 9, Henry L. Banzhaf		200 00
49	Jan. 11, The Whitelock Press		734 05
50	Jan. 22, A. C. Beckstine		33 65
51	Jan. 27, The Whitelock Press		565 00
	Total disbursements		$2146 93
	Receipts		$3485 28
	Disbursements		2146 93
	Balance on hand at Dr. McFadden's death		$1338 35

ARTHUR R. MELENDY, Treasurer.

*Report Continued from Page 71, March issue of The Journal.

HOUSE OF DELEGATES FOR 1915.

Two Afternoon Sessions, September 1-2.

Opening Session 2 P. M., Municipal Auditorium, San Francisco, Cal.

ALABAMA

Delegates

F. A. Johnson, Sheffield.
H. B. Peacock, Opelika.

Alternates

C. W. Lokey, Birmingham.
B. S. Searcy, Tuscaloosa.

ALASKA

Delegate

T. H. White, Sitka.

ARIZONA

Delegate

W. P. Sims, Bisbee.

Alternate

John A. Lentz, Phoenix.

ARKANSAS

Delegates

J. D. Jordan, Little Rock.
Ed. L. Watson, Camden.

Alternates

L. K. Charles, Eureka Springs.
J. W. Markwell, Little Rock.

ARMY DENTAL CORPS

No report.

CALIFORNIA STATE

No report.

CALIFORNIA SOUTHERN

Delegates

L. E. Ford, Los Angeles.
J. W. Neblett, Riverside.
C. C. Noble, Los Angeles.

Alternates

A. H. Gilbert, San Diego.
James D. McCoy, Los Angeles.
R. C. Lane, Los Angeles.

CANAL ZONE

No report.

COLORADO

Delegates

J. I. Laughlin, 314 Temple Court, Denver.
J. L. Howell, Mack Bldg., Denver.

Alternates

F. S. McKay, Colorado Springs.
John W. Duffy, Grand Junction.

CONNECTICUT

Delegates

Edward S. Gaylord, New Haven.
Alfred C. Fones, Bridgeport.
Charles McManus, Hartford.

Alternates

R. H. W. Strang, Bridgeport.
Albert W. Crosby, New Haven.
Louis L. Beach, Bristol.

DELAWARE

No report.

DISTRICT OF COLUMBIA

Delegates

A. J. Brown, Washington, D. C.
Wm. K. Petty, Washington, D. C.

Alternates

M. F. Finley, Washington, D. C.
George B. Welch, Washington, D. C.

FLORIDA

Delegates

C. L. Nance, Tampa.
W. A. Dean, Tampa.

Alternates

S. W. Allen, Tampa.
W. G. Mason, Tampa.

GEORGIA

Delegates

N. A. Teague, Augusta.
Robin Adair, Atlanta.

Alternates

Frank Holland, Atlanta.
Jos. D. Eby, Atlanta.

HAWAIIAN ISLANDS

Delegates

G. A. Braly, Honolulu.
Henry Bicknell, Honolulu.

Alternates

J. M. Whitney, Honolulu.
A. C. Wall, Honolulu.

IDAHO

No report.

ILLINOIS

Delegates

William H. G. Logan, Chicago.
O. L. Frazee, Springfield.
Arthur D. Black, Chicago.
T. L. Grisamore, Chicago.
T. A. Broadbent, Chicago.
F. W. Gethro, Chicago.
J. W. Cormany, Mt. Carroll.
W. A. Hoover, Gibson City.
George N. West, Chicago.
P. B. D. Idler, Chicago.

Alternates

E. W. Elliott, Chicago.
A. S. Waltz, Decatur.
George E. Meyer, Chicago.
T. W. Brophy, Chicago.
G. D. Sitherwood, Bloomington.
E. C. Hoffman, Plainfield.
W. H. Karcher, Champaign.
W. R. Neff, Chicago.
J. A. Bevan, Kankakee.
H. F. Methven, Chicago.

INDIANA

Delegates

E. R. Kibler, Indianapolis.
W. O. Vallette, Goshen.
Fred J. Prow, Bloomington.
Carl D. Lucas, Indianapolis.
T. H. Walsh, Indianapolis.

Alternates

A. R. Ross, Lafayette.
J. S. McCurdy, Ft. Wayne.
J. M. Hale, Mt. Vernon.
Charles Redmon, Peru.
Wm. Kennedy, Indianapolis.

IOWA

Delegates

R. H. Volland, Iowa City.
G. N. Beemer, Mason City.
C. V. Watts, Des Moines.
C. B. Miller, Cedar Falls.

Alternates

J. V. Conzett, Dubuque.
J. A. West, Des Moines.
W. G. Crandall, Spencer.
J. G. Hildebrand, Waterloo.

KANSAS

Delegates

H. W. Fessenden, Ottawa.
Willis Coston, Topeka.
C. E. Bergson, Leavenworth.

Alternates

F. O. Hetrick, Ottawa.
E. L. Glass, Independence.
George A. Crise, Manhattan.

KENTUCKY

Delegates.

H. B. Tileston, Louisville.
R. H. Leete, Prestonburg.
Fred R. Wilder, Louisville.

Alternates.

W. E. Grant, Louisville.
J. W. Clark, Louisville.
H. S. Lee, Louisville.

LOUISIANA

Delegates

Joseph P. Wahl, New Orleans.
N. J. Feitus, Baton Rogue.

Alternates

Wallace Woods, New Orleans.
E. B. Ducasse, New Orleans.

MAINE

No report.

MARYLAND

Delegate

B. Holly Smith, Baltimore.

Alternate

B. Merrill Hopkinson, Baltimore.

MASSACHUSETTS

Delegates

Horace L. Howe, Boston.
F. W. Allen, Boston.
W. H. Eaton, Boston.
D. F. Spinney, Brookline.

Alternates

F. S. Faxon, Brockton.
M. C. Smith, Lynn.
T. P. E. Greene, New Bedford.
W. F. Richardson, Worcester.

MICHIGAN

Delegates

W. A. Giffen, Detroit.
J. M. Thompson, Detroit.
C. H. Oakman, Detroit.
B. R. East, Detroit.

Alternates

G. B. Harris, Detroit.
George Copp, Plainwell.
Dennis Murray, Grand Rapids.
Harry D. Watson, Grand Rapids.

MINNESOTA

Delegates

Herman A. Maves, Minneapolis.

MISSISSIPPI

Delegates

L. B. Price, Corinth.
A. B. Kelly, Yazoo City.

Alternates

Rush P. Abbott, Westpoint.
P. M. Fugler, McComb.

MISSOURI

Delegates

J. H. Kennerly, St. Louis.
J. P. Harper, St. Louis.
F. M. Fulkerson, Sedalia.
S. C. A. Rubey, Kansas City.

Alternates

J. A. Cotton, Joplin.
J. W. Hull, Kansas City.
T. J. Sugg, Carrollton.

MONTANA
Delegate
T. M. Hampton, Helena.

NATIONAL CAPITOL
Delegate
E. A. Bryant, Washington, D. C.
Alternate
Charles W. Cuthbertson, Washington, D. C.

NAVY DENTAL CORPS
No report.

NEBRASKA
Delegates
J. M. Prime, Oxford.
O. H. Cressler, North Platte.
M. E. Vance, Lincoln.

NEVADA
No report.

NEW HAMPSHIRE
Delegate
Edwin D. Forrest, Tilton.
Alternate.
Louis I. Moulton, Concord.

NEW JERSEY
Delegates
Henry Fowler, Harrison.
J. B. Davidson, Newark.
Wm. H. Gelston, Camden.
Alternates
Raymonde A. Albray, Newark.
F. K. Heazelton, Trenton.
Arthur R. Slade, Milville.

NEW MEXICO
Delegate
E. J. Alger, Albuquerque.
Alternate
J. J. Clarke, Artesia.

NEW YORK.
Delegates
E. A. Smith, Rome.
H. L. Wheeler, New York.
H. W. Canaday, Albany.
W. W. Smith, Rochester.
Ellison Hilyer, Brooklyn.
Albert W. Twiggar, Ossining.
Louis Meisburger, Buffalo.
C. F. Baylis, Oneonta.
A. C. Rich, Saratoga.
Alternates
G. A. Potter, Cape Vincent.
W. C. Deane, New York.
C. K. Van Vleck, Hudson.
A. P. Burkhart, Auburn.
F. C. Walker, Brooklyn.
Stephen Palmer, Poughkeepsie.
D. H. Squire, Buffalo.
J. B. West, Elmira.
W. S. Rose, Schenectady.

NORTH CAROLINA
Delegates
J. S. Spurgeon, Hillsboro.
J. C. Watkins, Winston-Salem.
Alternates
C. L. Alexander, Charlotte.
R. M. Morrow, Burlington.

NORTH DAKOTA
Delegates
R. S. Towne, Bismarck.
Tom Smith, Langdon.
Alternates
E. N. Hegge, Hattan.
Wm. T. Sprake, Casselton.

OHIO
Delegates
L. L. Barber, 718 The Spitzer, Toledo.
H. C. Brown, 185 E. State Street, Columbus.
L. E. Custer, 28 N. Ludlow, Dayton.
J. R. Callahan, 25 Garfield Place, Cincinnati.
W. A. Price, 10406 Euclid Ave., Cleveland.
F. M. Casto, 520-522 Rose Bldg., Cleveland.
C. W. Mills, 52 W. Second Ave., Chillicothe.
E. C. Mills, 151 E. Broad Street, Columbus.
Alternates
W. E. Knight, Delaware.
G. J. Hawkins, Salem.
H. H. Erskine, Steubenville.
J. H. Linsley, Ashtabula.
T. S. Ward, Marietta.
L. E. Vinez, Louisville.
W. H. Sedwick, Newark.
C. W. Sheridan, Piqua.

OKLAHOMA
Delegates
A. B. Potter, Oklahoma City.
B. L. Shobe, Tulsa.
Alternates
J. R. Caughron, Oklahoma City.
T. H. Williams, Chickasha.

OREGON
Delegates
J. C. Jones, Portland.
C. M. Harrison, Portland.
Alternates
J. M. Miller, Eugene.
E. Hirstel, Portland.

PENNSYLVANIA
Delegates
J. F. Biddle, Pittsburg.
Alexander H. Reynolds, Philadelphia.
H. E. Friesell, Pittsburg.
Alternates
W. A. Capon, Philadelphia.
Victor S. Jones, Bethlehem.
R. Hamill D. Swing, Philadelphia.

PHILLIPINE ISLANDS
No report.

PORTO RICO

Delegate

Manuel V. del Valle, San Juan.

Alternate

Francisco Ponte, San Juan.

RHODE ISLAND

Delegates

Albert L. Midgley, Providence.
Frank P. Duffy, River Point.

Alternates

William B. Rogers, Providence.
M. W. Maloney, Providence.

SOUTH CAROLINA

Delegate

L. P. Dotterer, Charleston.

SOUTH DAKOTA

No report.

TENNESSEE

Delegates

Arthur R. Melendy, Knoxville.
J. A. Dale, Nashville.

Alternates

S. L. Rich, Nashville.
R. S. Henry, Chattanooga.

TEXAS

Delegates

Bush Jones, Dallas.
G. Waller Staples, Dallas.
S. C. Noble, Mineola.

Alternates

J. P. Arnold, Houston.
L. A. Neil, Grand Saline.
R. H. Stuart, Waco.

TRUSTEES

***Delegates**

H. J. Burkhart, '17, Batavia, N. Y.
J. P. Buckley, '17, Chicago, Ill.
Thomas P. Hinman, '17, Atlanta, Ga.
Clarence J. Grieves, '16, Baltimore, Md.
Waldo E. Boardman, '16, Boston, Mass.
Marcus L. Ward, '16, Ann Arbor, Mich.
Thomas B. Hartzell, '15, Minneapolis, Minn.
C. L. White, '15, Oklahoma, City, Okla.
S. W. Wherry, '15, Ogden, Utah.

*"The trustees shall be members of the House of Delegates without the right to vote."—Constitution and By-Laws, Article V, Section 1.

UTAH

Delegate

S. W. Wherry, Ogden.

Alternate

Fred W. Meakin, Salt Lake City.

VERMONT

Delegate

J. Holmes Jackson, Burlington.

Alternate

R. M. Chase, Bethel.

VIRGINIA

Delegates

F. W. Stiff, Richmond.
J. G. King, Fredericksburg.

Alternates

C. T. Womack, Martinsville.
A. H. Sprinkle, Staunton.

WASHINGTON

Delegates.

F. W. Hergert, Seattle.
George T. Williams, Seattle.

WEST VIRGINIA

Delegates

John W. Storer, Wheeling.
W. B. Conaway, Clarksburg.

Alternates

S. Benton Langfitt, Parkersburg.
Frank L. Wright, Wheeling.

WISCONSIN

Delegates

E. A. Geilfuss, Milwaukee.
Charles A. Babcock, Milwaukee.
C. W. Hall, Milwaukee.
A. J. Dubois, Neenah.

Alternates

W. W. Powell, Janesville.
T. G. McGrory, Kenosha.
F. E. Raiche, Marinette.
A. G. Fee, Superior.

WYOMING

Delegate.

Peter Appel, Jr., Cheyenne.

THE JOURNAL
of the
NATIONAL DENTAL
ASSOCIATION

Entered as second-class matter, March 22, 1915, at the Post Office at Huntington, Indiana, under the Act of August 24, 1912. Published Quarterly.

All contributions and correspondence should be addrest to the General Secretary,
OTTO U. KING, D. D. S.,
Huntington, Indiana.

Subscription to The Journal of the National Dental Association included in the annual dues.

Subscription Price, for 1915, to non-members, living in all parts of United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Cuba, Canal Zone and Mexico, $1.00. Canada, $1.10. To other foreign countries, $1.40.

The editor and publishers are not responsible for the views of authors exprest in these pages.

VOL. 2 AUGUST, 1915 NO. 3

EDITORIAL

ON TO SAN FRANCISCO!

At the Annual Meeting of the National Dental Association held in Washington in 1912 a California delegation, headed by Dr. Frank L. Platt, extended an invitation to the Association to hold its 1915 meeting in San Francisco in conjunction with the Panama-Pacific Dental Congress. This invitation was unanimously accepted.

Dr. Platt assured us that every provision would be made to make the Congress one of the greatest in dental history. He promised unequalled facilities for meetings, clinics, exhibits and hotel accommodations. That the committee has more than fulfilled its promise is demonstrated by the excellent program arranged and by the reports from many different sources.

San Francisco will be the Mecca for all the scientific, civic, religious, fraternal, educational, industrial and professional associations. No less than eight hundred and twenty-two congresses, conventions and conferences will meet during the Exposition. To provide for the convenience and accommodation for these gatherings, San Francisco has built one of the greatest auditoriums in the World, the main hall seating 12,000 and numerous other halls seating from

500 to 1500 each. With such accommodations a great Congress can carry on all its many departments and interests in the most satisfactory manner.

To fully appreciate the scope of the Panama-Pacific Dental Congress, one has only to look at the official announcement of Congresses to see that the Dental Congress will be one of the most important. Every branch of our profession will be given ample time to present and consider its particular work.

Among the organizations making up the Congress are the International Dental Federation, National Association, National Association of Dental Examiners, Association of Dental Faculties, American Association of Orthodontists, Delta Sigma Delta, Psi Omega, and Ti Psi Phi Fraternities, and the State Dental Societies of the Pacific Coast. Surely this Congress should appeal to every progressive dentist!

The officers and committees in charge of this great undertaking have labored hard for three years to make it a notable success. How do **you** propose to help them?

While distance and time may prevent many from attending, there is nothing to prevent you from becoming a member, in this way our far west colleagues will be supported and encouraged and you will profit by the association and the transactions.

You know our profession has not been standing still for the past year, wonderful developments have taken place. You can not afford to drop behind.

The transportation committee of the National Dental Association and the Congress have arranged a number of very attractive routes giving you an opportunity of traveling thru a country unequalled for beauty and grandeur.

There awaits you at the Golden Gate that hospitality which has made California famous.

Members from the North, South, East and Middle West, on to Frisco!

DONALD MACKAY GALLIE,
President.

THE JOURNAL OF THE NATIONAL DENTAL ASSOCIATION.

This issue of the Journal of the National Dental Association, is the third copy under that title published; and the officers and committees of the National Dental Association, feel that they have put their hand to the plough and may not turn back. The success of the worth thus far of publishing our own Journal and our own proceedings is far greater than those who have carried on the work anticipated. When the Secretary of the National Dental Association and acting editor began this work, it was with some misgivings, as to the raising of the dues of the National Dental Association; for it takes money to properly publish a scientific Journal. The Board of Trustees and the Journal Committee, seeing the possibilities in this enterprise and realizing the desirability of having our Journal uniform from the first volume on, decided to adopt the name Journal

of the National Dental Association, without waiting for the organization of a Journal staff and the increase in dues. This was made possible by the discovering that our Secretary had the qualities of a first-class editor, as well as a good secretary, and the whole Association is indebted to him for the way in which he is carrying on the work. A man may have the organizing ability of a Napolian, and the genius of a Franklin, but without the co-operation and support of his associates, his efforts will be handicapped and defeated. This, therefore, is an appeal to the members of the National Dental Association thruout the length and breadth of this broad land to show their appreciation of the industrious efforts being put forth by our own Secretary by assisting and supporting him loyally at every point. We must remember that as a profession, bound together in a national organization owing and publishing the medium, that records our efforts and activities, we are as a man born again; we have put off the swaddling clothes of dependency and have accepted the armour of responsibility. Having accepted responsibility, it is the duty of every member of the association, to in every way possible, by loyalty, by service, by industrious effort, to supply to the National Dental Association a careful and painstaking statement of our work and efforts to improve our service to humanity. Let him who has discovered a more ingenious and a less trying and tedious method of operative procedure, or prosthetic artisanship make the fact known before our national meetings or directly to the editor of our Journal. Let those who have discovered means of palliating, preventing or eliminating the scourge of disease that manifests itself in the mouth, make those discoveries known to our National Dental Association, that the facts may be published abroad to all the intelligent members of our profession and the ability of our profession to serve humanity be correspondingly improved. Let those who by deftness of touch, and acuteness and precision of direction, have come to perform such wonderful operations upon congenial and acquired defects in the human mouth, announce and describe their work to our National Dental Association that the members of the profession may know on who to rely in referring patients for these delicate operations and that some may become stimulated to develop and prepare themselves to do similar work. If this is done in these various activities of our profession, the Journal of the National Dental Association will become a record that no self respecting member of the profession, or one whose motive is service to his patients, can afford to be without. The responsibility is upon every member of our association to contribute towards this end. With our honest and sincere efforts extended in this direction there will be no question of the scientific or social standing of members of the profession.

HERBERT L. WHEELER,
Chairman Journal Committee.

ITEMS OF INTEREST.

GREAT DENTAL DISPENSARY TO BE BUILT AND ENDOWED BY HEAD OF KODAK COMPANY.

ANNOUNCEMENT TO DENTAL SOCIETY.

(Rochester, New York, Democrat and Chronicle, Wednesday, July 21, 1915.)

WHEN the lights were dimmed in the assembly room of the Medical Club last night and a picture of a great Dental Dispensary that Rochester is to have was projected upon a screen, a man in the audience, which was made of members of the Rochester Dental Society and city officials, exclaimed:

"This is the finest thing George Eastman has done for Rochester!"

And throughout the meeting of the Dental Society, in a dozen speeches, the thought was emphasized that the dispensary will be a priceless addition to the public institutions of the city.

The society and its guests met to hear an announcement of George Eastman's latest, and biggest, gift to the city, a Dental Dispensary in Main street east that is expected to be the finest institution of its kind in the world; a gift that, prospective endowment included, means an investment of $1,200,000.

Praise and Congratulation.

It was nothing but bursts of praise and volleys of congratulations, that meeting of the Dental Society. The dentists, who have been behind the present dispensary through many hard years, came to hear Mr. Eastman's gift described, learn what it included; but the session promptly resolved itself into an occasion for felicitous phrases. And the dentists were no less praised than the man who makes the great building possible.

Mayor Edgerton, J. Warrant Castleman, president of the School Board; James P. B. Duffy and Howard A. Barrows, school commissioners; Sheriff Charles S. Owen, Charles E. Ogden, Dr. Montgomery E. Leary, superintendent of Iola Sanatorium and four Buffalo dentists told the members of the society that Mr. Eastman's gift would not now be possible without the years of work that had preceded that present unparalleled good fortune. Nor were William Bausch and the late Captain Henry Lomb, who made the first dispensary possible, overlooked.

Dispensary of Broad Scope.

The building, as announced by Dr. William W. Smith, will be three stories in height and cost about $300,000, fully equipped. It will be provided with every convenience for advanced dental study and the furtherance of educational and research work. At the start about twenty chairs with competent operators will be provided. More will be added as the work progresses. Provision will be made for performing all operations in oral surgery, and for surgical treatment

of the nose and throat, when the condition of those organs is associated with oral diseases. Orthodontic work will be a special feature.

A research laboratory, a radiographic laboratory, a lecture room and an amusement room are additional features. There will be regular courses of lectures for the members of the staff, and a training school for women who are preparing to take up prophylactic work.

And the whole institution will be for the special benefit of children. "There is no greater work," said the Mayor.

Anncuncement of Gift Read.

Dr. Rudolph Hofheinz presided at the meeting. He paid a high tribute to Dr. William W. Smith who, he said, had worked harder for the dispensary than any other individual, and who he hoped would be one of the members of the First Board of Trustees. Mr. Smith read the announcement of Mr. Eastman's gift, and then Mayor Edgerton was called upon.

Mayor Edgerton said a good many happy things about the dentists and Mr. Eastman and Mr. Bausch; but the thing that probably made the greatest impression was his virtual promise that the yearly appropriation for five years which Mr. Eastman makes one of the conditions of his gift will be forthcoming.

"Mr. Eastman's gift is almost unparalleled," the Mayor said. "He must lie awake nights trying to think of things to do for Rochester. I think we will hear from him again. He has never done a bigger thing than this latest."

Made Possible by Dentists.

Mr. Castleman, the next speaker, said it was a very happy evening for him.

"Because," he went on, "it is my pleasure to congratulate the dentists, and because, great as Mr. Eastman's gift is —and he has never made a greater—it could not be possible without the long years of work in preparation for this time."

Every other speaker had something equally pleasant to say, and Dr. Frank Low, of Buffalo, one of the last men to be called upon, paid a high tribute to the spirit of the meeting.

"If the dentists of Rochester consider Buffalo a suburb of the city," he said, "I'd like to give a dollar to that citizens' fund Mr. Eastman mentions in his conditions."

Endowment Fund of $750,000 for Dispensary After Five Years.

Mr. Eastman's gifts for the establishment and maintenance of the Dental Dispensary will amount to $1,200,000, under the plan outlined last night. This will be the largest sum ever given by him for one purpose, and it will raise the total of his large gifts, so far as these are known, to about $3,500,000.

The principal facts of the gifts for the Dental Dispensary are as follows:

Dispensary to be built and equipped by Mr. Eastman at a cost of $250,000 to $300,000.

Conditions: City to provide at least $12,000 a year for five years to carry on the work in the schools. Private citizens to contribute $10,000 a year for five years.

Mr. Eastman himself to contribute $30,000 a year for five years, and at the end of that period to furnish an endowment of $750,000 if the conditions have been met and the work is going on satisfactorily.

Site on north side of Main street east a short distance east of Alexander street.

Society Adopts Resolutions.

Resolutions thanking Mr. Eastman and Mr. Bausch were adopted by the society. They follow:

Resolved, That the Rochester Dental Society pending further and more formal action, at a regular meeting, express to Mr. Eastman its appreciation of the exceptional opportunity afforded the society to extend and broaden its work of dental relief; and that it pledge him in this great benefaction its unqualified professional and practical support.

Resolved, That the thanks of the Rochester Dental Society are due and are herein extended to Mr. Bausch for the great interest he has taken in the work of the society; and also for the effective manner in which he has added to the possibilities of their work in meeting the conditions involved in Mr. Eastman's plans for the Rochester Dental Dispensary.

Dr. Rudolph Hofheinz was named by the society as its first representative on the Board of Trustees of the Dental Dispensary. Neither the number nor the names of the other members will be announced immediately. It is understood, however, that at least nine more will be named and that they will all be business men.

It was announced unofficially last night that the $750,000 endowment promised by Mr. Eastman is the first endowment made in his long list of benefactions in Rochester.

Nature and Terms of Gift.

The statement of Mr. Eastman's gift, which was read by Dr. Smith, was as follows:

Through the generosity of George Eastman and the active interest of several prominent business men of this city, the Rochester Dental Society is about to realize an ambition which it has entertained for some years, and toward which it has been working steadily. Indeed, what has been done is far ahead of what any of the members of the Dental Society had dared to dream, for Rochester is to have a dental dispensary second to none in the country, and the only one of its kind except the Forsyth Dispensary in Botson.

The building will be three stories, of handsome design, and will cost about $300,000, fully equipped and including land. It will be provided with every convenience for advanced dental study and the carrying on of educational and research work. There will be about twenty chairs with competent operators at the start, and room for more as the work progresses. Provision will be made for performing all operations in oral surgery, all surgical and other treatments of the nose and throat when the condition of these organs is associated with oral diseases. Orthodontic work will be a special feature, as it has come to be known that narrow and contracted jaws and irregular teeth are a serious handicap to the child. The correction of these abnormal conditions is very important.

Laboratory for Research.

A fine research laboratory is to be provided, where special attention will be given for studying the causes and effects of diseases of the mouth and teeth. There will also be a radiographic laboratory for X-ray work, which work is becoming very important in diagnosing dental diseases, and provision will be made for the extraction of teeth by the use of anesthetics. A very complete and perfect system for sterilizing all dental instruments will also be installed.

A fine lecture room, constructed with special attention to its acoustic properties, and an amusement room will be attractive features of the structure. Here the children will be entertained and under the guise of amusement they will be taught the necessity for cleanliness in the care of their teeth. There will be regular courses of lectures for the internes and members of the staff, and a training school will be established for women who are preparing to take up prophylactic work. In time, it is planned to send these women into the schools of the city to do this work and to instruct the children as to the necessity for taking care of the teeth, thus opening up a new field for young women. This institution will be an ideal place in which they may qualify for this service. In some of the Eastern cities this school work has become an important part of preventive philanthrophy, and there are places where no contagious diseases have been communicated among the children who are under proper dental care.

Site in Main Street East.

The building will be erected in Main street east, near the corner of Alexander street, on the vacant lot between the chapter house of the Theta Delta Chi Fraternity and the residence of Edward McSweeney. It will also have an opening on Kenilworth terrace, made possible by the purchase of a house and lot at the northwest corner of the street. Plans for the buildings have been prepared by Gordon & Madden, and it will be the most complete of its kind in the world.

For several months Mr. Eastman has been deeply interested in the subject of preventive dental work among children. He went as far as to visit the Forsyth Dispensary in Boston, one of the greatest institutions of its kind, and carefully studied its work, and the more he understood the scope of the work the more deeply interested he became. Then after conference with William Bausch, who has always taken the keenest interest in this work, and a committee from the Rochester

Dental Society, he made the proposition to the society that he would build and equip a dental dispensary at a cost of from $250,000 to $300,000, this conditioned upon the willingness of the city to furnish at least $20,000 a year for five years, an amount sufficient to carry on the prophylactic work in the schools; that private citizens contribute $10,000 a year for five years, and Mr. Eastman himself would contribute $30,000 a year for five years. At the end of that time Mr. Eastman will furnish an endowment of $750,000 if these conditions have been met and the work is being carried on satisfactorily. He will then have paid into this enterprise over one million dollars.

Superintendent to be Engaged.

The work has been thoroughly outlined and every detail has been gone into with Mr. Eastman. A superintendent will be engaged very soon, and a search is already on for a man who will be perfectly competent from a professional standpoint and big enough as an executive to fill this position. The work will be under his supervision from the very start, much the same as the work of the public libraries was developed under a newly appointed superintendent.

The work of the Rochester Dental Society looking toward a dispensary has been intelligent and persistent. The necessity for a place to take care of the teeth of the worthy poor of the city, especially the children, was early recognized, and the first institution of its kind was established at the Rochester City Hospital by members of this society some twenty-eight years ago and continued for two years, then abandoned because of lack of support.

A few members, however, refused to be balked, and persisted in the feasibility of re-establishing such an institution. A committee was appointed, and after serving several years, reported that Captain Lomb would advance a sum of money sufficient to equip a free dental dispensary, to be the property of the society. On receipt of this report the committee was empowered to secure accommodations with some of the hospitals, but none was able to offer quarters with a suitable light and other essentials. Through the courtesy of the Public Health Dispensary this dispensary was located in its rooms, the association furnishing rooms, heat and electricity free to the Dental Society. This dispensary has been in successful operation ever since.

Chartered by State Board.

The sum of $600 was tendered the society and was deemed sufficient, but through donations from local merchants, dental manufacturers and dealers, an equipment valued at $1,200 was secured free from all indebtedness. A charter was obtained from the New York State Board of Charities, and the dispensary opened to the public on Washington's birthday, February 22, 1905. It was kept open two afternoons each week, and twenty-four members alternated in attendance the first year. Captain Lomb then offered to pay the salary of one or more dentists who would be present each week day from 2 to 5 o'clock

The Rochester Dental Society has been a pioneer in this work in this country. The first dental dispensary in any school in the United States was established in No. 14 School, in this city. Since that time the work has been taken up in the schools of many other cities, appropriating varying amounts from public funds for maintenance. Detroit has appropriated this year the sum of $30,000. The splendid gift of William Bausch made possible a complete equipment for No. 26 School, and recently Albert E. May offered to establish a dispensary in No. 18. Other public spirited citizens have made like offers, especially in the case of No. 9, but these offers have not been considered, owing to the completion of the present plans. It has been decided that more efficient work can be done in this central dispensary, but trained workers will be sent to the schools with portable outfits for doing hygienic work, who will train the children in the care of the mouth and teeth.

Encouraging to Society.

It will be remembered by many that when the actor William Hodge was in the city some years ago, he offered to give $1,000 to the charity which the committee should select as the most worthy. The committee reported in favor of the Dental Dispensary. This was another gift which helped to encourage those who were looking forward to the larger development of the work.

The dedication of the Forsyth Dental Infirmary, the work of which so impressed Mr. Eastman, took place last November and marked an epoch in dental history. At that time Thomas Alexander Forsyth said:

"It has been my wish that the Infirmary should be as a home to the children, beautiful and cheerful; a protector of their health, a refuge in their pain. By making them healthier and happier, I hope it may make them grow to be better citizens of our beloved Boston. If this is accomplished, as I believe it must be, with the co-operation of the dental profession, I shall feel that the gift has been well bestowed."

This is the idea that Mr. Eastman has in mind when he makes this princely gift to the children of Rochester, to the children who, for one reason or another, cannot meet the expense of expert dental work, many of whom suffer all through life because of neglect of their teeth.

Boston Dispensary Highly Prized.

The Forsyth building is partly of marble and has been beautified especially since it is a memorial to James Bennett and George Henry Forsyth, brothers of the two Forsyths who erected it. There are many in the city of Boston who are of the opinion that never in the history of the world has money been so wisely expended as in

this philanthrophy. It has proven an uplift to the dental profession and will advance its power for efficient service.

The Rochester Dental Dispensary will serve the same purpose, and will prove one of the most far-reaching philanthropies ever advanced in this city. The number of diseases which may be traced to the teeth is increasing. The whole life of a person may be wrecked by neglect of the teeth in early youth. We are coming to understand this truth more perfectly, and Rochester is taking its place as a pioneer in the advanced work of prevention which comes from a better understanding of the teeth and mouth.

THE MAYOS' GIFT.

In these days of great gifts to education from funds that were amassed in ways not too innocent, it is refreshing to learn that the Mayo brothers have given $2,000,000 to the University of Minnesota, together with what is probably the finest equipment for medical research in the world. The very size of the gift shows how wealth as well as fame has come to two country physicians, sons of a country doctor. In their case it was not necessary to move to some centre of influence and publicity, a great city. The world found its way to their door because they had something of knowledge and technic that the world needed. The pilgrimage of 3000 physicians a year to Rochester, Minnesota, is itself a splendid tribute to the genius of the two brothers.

Now their influence will be perpetual through their endowment for medical training and research.—*Norman Hapgood.*

THE MAN WHO DELIVERS THE GOODS.

By Walt Mason.

There's a man in the world who is never turned down, wherever he chances to stray; he gets the glad hand in the populous town, or out where the farmers make hay; he's greeted with pleasure on deserts of sand, and deep in the aisles of the woods; wherever he goes there's the welcoming hand—he's THE MAN WHO DELIVERS THE GOODS. The failures of life sit around and complain; the gods haven't treated them white; they've lost their umbrellas whenever there's rain; and they haven't their lanterns at night; men tire of the failures who fill with their sighs the air of their own neighborhoods; there's the man who is greeted with love-lighted eyes—he's—THE MAN WHO DELIVERS THE GOODS.

One fellow is lazy, and watches the clock, and waits for the whistle to blow; one has a hammer, with which he will knock, and one tells the story of woe; and one, if requested to travel a mile, will measure the perches and rods; but one does his stunt with a whistle or smile—he's THE MAN WHO DELIVERS THE GOODS. One man is afraid he'll labor too hard—the world isn't yearning for such; and one man is ever alert, on his guard, lest he put in a minute too much; and one has a grouch or a temper that's bad, and one is a creature of moods, so its hey for the joyous and rollicking lad—for THE ONE WHO DELIVERS THE GOODS!

ANNOUNCEMENTS.

INTERNATIONAL.

International Dental Federation, San Francisco, Cal., August 30, 1915.

NATIONAL SOCIETIES.

Panama-Pacific Dental Congress, San Francisco, Cal., August 30-Sept. 9, 1915.

National Dental Association—House of Delegates, Sept. 1-2, 1915, San Francisco, Cal.

American Society of Orthodontists, Aug. 30, 1915, San Francisco, Cal.

STATE SOCIETIES.

August.

New Mexico—Albuquerque, Aug. 23-25.

September.

National Capitol—Washington, Sept. 7.

November.

Arizona—Phoenix, November 11-13.
Virginia—Richmond, November 4.

December.

Maryland—Baltimore, December.
Ohio—Columbus, December 7-8-9.

THE FOLLOWING CONVENTIONS WILL MEET WITH THE PANAMA-PACIFIC DENTAL CONGRESS.

Federation Dentaire Internationale.
Delta Sigma Delta Dental Fraternity.
American Society of Orthodontists.
Southern California Dental Society.
Psi Omega Dental Fraternity National Alumni.
Salt Lake County Dental Society.
National Association of Dental Examiners.
Research Commission of National Dental Association.
House of Delegates National Dental Association.
California State Dental Association.
Utah State Dental Society.

THE NEW MEXICO DENTAL SOCIETY.

The New Mexico Dental Society will hold its annual meeting at Albuquerque Aug. 23, 24, 25. We earnestly urge all members to be present. We cordially invite members of other societies to meet with us. The National Dental Special will be with us about four hours on the 24th. We expect to have a big time, so come along and help us.

J. J. CLARKE, Secretary,
Artesia.

AMERICAN ACADEMY OF ORAL PROPHYLAXIS AND PERIDONTOLOGY.

The first annual meeting of the American Academy of Oral Prophylaxis and Peridontology will be held on September 20-21-22, at the Hotel Statler, Detroit, Michigan.

All dentists in good standing are cordially invited to attend if interested in advancing this special field of work, as a most inspiring and helpful program will be given.

GRACE ROGERS SPALDING, D. D. S.,
Chairman Publication Committee.

TWO SESSIONS OF RESEARCH COMMISSION.

At San Francisco September 1-2, 1915.

Dr. Weston A. Price, Chairman of the Research Commission, announces that the Chairman of the Panama-Pacific Dental Congress has given to the Research Commission, two forenoon sessions on Wednesday and Thursday, September first and second.

PANAMA-PACIFIC DENTAL CONGRESS.

SPECIAL ANNOUNCEMENT.

From Committee on Organization.

August 30th, the date on which the Panama-Pacific Dental Congress will meet in San Francisco is near at hand. The Committee of Organization desires to announce that the Congress will open on time with an exceptionally good program. About 130 papers and over 200 clinics are now promised for the program, the resume of which follows:

Practically all the exhibit space at the disposal of the Committee is now occupied and no other Congress has had such a complete exposition of dental and pharmaceutical goods as will be presented here. Everything points to a large and successful meeting. Nearly eleven hundred applications for memberships are now on file and more are coming in daily.

The Membership Committee urges all who expect to attend the Congress, to fill out their application blanks, have them signed by a member of the Executive Committee of the State in which they reside, and forward with check, draft or P. O. Money Order for Ten Dollars to the Secretary, Dr. A. M. Flood, 240 Stockton St., San Francisco. This should be done as soon as possible as it will save the dentist considerable trouble and annoyance, and will facilitate the work of registration. Those who have not paid for their membership, nor have filed their applications for membership, properly endorsed, but expect to obtain membership in the Panama-Pacific Dental Congress upon reaching San Francisco, must make provision to secure proper credentials from their State or local dental society, to file with their application. Those not members of any dental society must secure the endorsement of the Executive Committee from the State in which they reside.

REGISTRATION.

The Importance of Registering Early.

The Bureau of Registration will be located on the Exposition Memorial Auditorium, Grove, Larkin, Hayes and Polk Streets.

A Branch Post Office and Bureau of Information will be established in connection with the Registration Bureau.

Members must register in order to obtain the Official Program and invitation to entertainments. All are urged to register as soon as they can name their hotels. The Registration Department will be open from 8:30 A. M. to 5:30 P. M. on Monday, August 30th, 1915, and these hours will be kept each succeeding day during the Congress, as long as necessary for the accommodation of those wishing to register. Be sure to bring the Membership Card sent you from the San Francisco office when you paid the membership fee.

HOTEL RESERVATIONS.

Altho San Francisco can easily accommodate all those in attendance at the Panama-Pacific Dental Congress, members are urged to make their hotel reservations early. It will be a great comfort upon arriving in San Francisco to go at once to a hotel that is expecting you, rather than to make a round of hotels, finding a number of them completely filled and finally being compelled to take the first lodgings which can be found in a hurried personal search. Reservations may be made thru the San Francisco Hotel Bureau, Kearny and Market Streets, S. F., or thru the Exposition Tour Service Company, 155 Sutter St., S. F., Cal. Take the reply you receive with you to San Francisco, then on arriving all you will have to do is to go to this hotel and register.

In requesting a hotel reservation be sure to state your full name and home address, the date you expect to reach San Francisco, the number in your party, the number of rooms required, the rate

per day per person, per room—you are willing to pay and the hotel you prefer, if any.

MAIL.

You may have you mail sent to you in care of Panama-Pacific Dental Congress. Exposition Memorial Auditorium, San Francisco, Cal.

EXPOSITION TOUR SERVICE CO.

June 23, 1915.

Committee of Organization,
Panama-Pacific Dental Congress,
San Fr..ncisco, Cal.

Gentlemen:

Agreeable to your request we herewith submit service agreed upon for the members of the Panama-Pacific Dental Congress which will hold its meetings in this city from August 29th to September 9th, 1915.

We will furnish rooms with private bath to any of the Members of your Congress, their families and friends, commencing Sunday, August 29th, for a period of ten (10) days in either of the following hotels: Clift, Bellevue, Palace, St. Francis, Stewart, Chancellor, Plaza, Somerton, Fielding, Ramona, Kensington, Worth, Wiltshire, Thoma, Glen, Arlington, and other hotels of like character and price respectively, to accommodate all of the Members of your Congress, their families and friends who will make reservation within a reasonable period.

It being understood that your Members and friends may have choice of hotels at the prices herein quoted up to the limit of rooms available to us in each hotel respectfully, and after such limit has been reached they will be furnished the same accommodations in other hotels of the same price as the hotel selected; all such hotels to be subject to your approval.

We will furnish auto and taxi service from the depot to the hotels on arrival from the hotels to the depot on departure.

We will transfer all baggage to and from the Hotels.

We will give each person ten (10) admissions to the Exposition Grounds. These will be good at any time and may be used by any person.

We will give one auto sight-seeing tour of San Francisco and the Bay Battleship boat cruise on San Francisco Bay, visiting the points of interest and battleships and landing at the Yacht Harbor on the Exposition Grounds.

We will take the wives and daughters of those who take our service on an auto tour, leaving the Clift Hotel at 10 o'clock a. m. on September 2, going out Geary street to Van Ness avenue, thence thru Van Ness avenue to the Presidio, thru the Presidio, giving them a view of the Golden Gate, also a birdseye view of the Exposition Grounds, State Buildings and Exhibition Palaces from Presidio Heights, thence thru Golden Gate Park to the Cliff House, thence along Ocean Drive, Sloat and Junipero Boulevards and the El Camino Real to the Peninsula Hotel at San Mateo. We will furnish and serve a table de hote luncheon to the ladies at the Peninsula Hotel and after luncheon return with them over Portola Drive and Crockett Road, giving them a birds eye view of San Francisco and the Bay from Ashbury Heights and return them to their hotels at about four o'clock p. m.

We will give the wives and daughters of those who take our service a theatre party on Saturday evening, September 4th. Your Committee to approve the theatre.

We will include the "Dr. Pague Special Entertainment."

We will have our representative meet all of your special trains at suitable points several hours out of San Francisco, prepared to register your members in their respective hotels, tag and care for their baggage and make all other arrangements necessary for their convenience on arrival.

We will furnish the above specified rooms for ten (10) days, service and entertainment in the following hotels respectively at the prices marked opposite thereof, to-wit:

	Price of One Room when Occupied by		
	One Person	Two Persons	*Three Persons
St. Francis Hotel.....	$65.20	$50.20	$44.85
Palace and Clift.....	55.20	41.50	36.50
Fielding, Ramona and Hotels of same character and price.....	51.00	36.00	32.00
Worth, Kensington and Hotels of same character and price.....	37.50	30.00	27.50
Glen, Arlington and Hotels of same character and price.....	30.00	25.00	23.70

*Using one double bed and one bed couch.

The prices above set forth are for a full ten (10) days' service and are to be paid as follows:

For each reservation, $10 cash on making reservation, the balance in each case to be paid to us on arrival.

The above payments to be made directly to this Company. It is understood that your Committee will deliver to us immediately upon receipt, all inquiries and applications for reservations and all payments received on account thereof and that you will cause due publicity to be made of the arrangements for reservations in the regular Dental publications.

Yours very truly,
JOHN C. HUGHES,
General Manager.

WYOMING STATE DENTAL ASSOCIATION ORGANIZED.

The dentists of the state met at the capitol yesterday and organized the Wyoming State Dental Association. The following officers were elected for the ensuing year: William Kocher of Casper, president; Carl Nydegger of Laramie, vice president; Peter Appel, Jr., of Cheyenne, secretary; W. H. Andrew of Cheyenne, treasurer.

The purpose of the association is to promote science, art of dentistry, sustain and elevate the professional character of dentists and to encourage social intercourse and good feeling. All ethical dentists who are legally registered in the state are eligible to become members.

The following are the charter members of the new association: Carl Nydegger, C. P. McNiff, and W. H. Douglas of Laramie; W. Thomas and William Kocher of Casper; F. M. Booth of Basin; L. C. Bunten of Rawlins; J. H. Humphrey of Powell; H. E. Tisch of Wheatland; Rees Williams, J. A. Devine and Peter Appel, Jr., of Cheyenne.

An invitation to hold the next meeting of the association in Casper was extended and accepted.

The state board of dental examiners also met yesterday and considered the following applicants: W. H. West, H. W. Harp, U. R. Vaughn, J. J. Grinnell, J. R. Inman, J. G. Morris, A. E. Owen, M. J. Ziering, G. E. Peterson, M. E. Silverberg, D. C. Stannard, E. L. Hay, S. A. Swett, L. Cheese, N. R. Moxley, E. E. Prescott, J. E. Woolm and Samuel Goldman.

The officers of the board are James R. Calvert, Evanston, president; H. E. Tisch of Wheatland, vice president, and Peter Appel, Jr., Cheyenne, secretary. They will be in session for three days.
—*Cheyenne State Leader, June 29, '15.*

F. D. I.

The next meeting of the International Dental Federation will be held September 2-3, 1915, at San Francisco, California.

Headquarters will be at The Clift Hotel.

BURTON LEE THORPE,
Assistant Secretary,
3605 Lindell Blvd.,
St. Louis, Mo.
TRUMAN W. BROPHY, President.

SPECIAL NOTICE FROM TRANSPORTATION COMMITTEE.

To the Members of the National Dental Association.

Make your reservation now, in order to lend your early encouragement to the the organization of a party large enough to insure the operation of a special train for the exclusive accommodation of our organization.

Those starting from Boston should address requests for information to C. E. Colony, City Ticket Agent B. & A. R. R.

Reservations for parties from New New York will be made by W. V. Lifsey, General Eastern Passenger Agent, New York Central Lines, 1216 Broadway, N. Y.

From Chicago, reservations will be made by A. J. Puhl, General Agent Passenger Dept. Burlington Route, 141 So. Clark St., Chicago, Ill.

TRANSPORTATION COMMITTEE
NATIONAL DENTAL ASSOCIATION.

HOTELS ARE OVERCROWDED. MADE RESERVATIONS.

July 14th, 1915.

Dr. O. U. King, General Secretary,
Huntington, Indiana.

Dear Doctor:—As far as we can ascertain from the Exposition Tours Service Company, the Hotel Clift, and others, we do not learn that the members of the National Association have made any arrangemants as yet for hotel accommodations.

There are but one hundred rooms reserved in the Hotel Clift, which at most will accommodate but two hundred people.

We would urge you to give this matter your immediate attention and either arrange for rooms thru the San Francisco Hotel Bureau, or enter into arrangements with the Exposition Tours Service Company who are in a position to give you excellent accommodations at very reasonable rates and also attend to your personal comfort in the way of transportation to and from hotels, and baggage transferred, besides offering a number of most attractive and interesting entertainment features which I am sure the ladies at least would be glad to avail themselves of.

This is a serious matter, as our hotels are becoming rapidly overcrowded and we would dislike very much to have you arrive here and be put to the discomfort of hunting for rooms or waiting for a chance to lay your head.*

If we can be of any service to you, please command us. In the meantime, believe us to be,

Fraternally yours,

PANAMA-PACIFIC DENTAL CONGRESS COMMITTEE OF ORGANIZATION.

ARTHUR M. FLOOD, Sec'y.

*A word to the wise and prudent should be sufficient.—Editor.

PANAMA-PACIFIC DENTAL CONGRESS.

San Francisco, August 30th to September 9, 1915.

To the Members of the National Dental Association.

The Transportation Committee of the National Dental Association prepared three railway schedules (Special Trains.) The schedules in booklet form, were forwarded by the Secretary to members of the Association.

The booklet contains a full description of routes, train schedules, etc. Read the same. The following is only a few references of what the booklet contains.

Train Schedule No. 1 is to

Start from Boston August 20th, 2:00 p. m., B. & A. R. R.

Leave New York August 20th, 5:00 p. m., N. Y. C.

Arrive Albany August 20th, 8:15 p. m., N. Y. C.

(Connect with trains from Boston and other points in New England States.)

Arrive Chicago 2:00 p. m. August 21st, N. Y. C. (Central station.)

Leave Chicago 6:10 p. m., August 21st, C. B. & Q.

Arrive Kansas City 8:00 a. m., August 22nd, C. B. & Q.

Leave Kansas City 11:00 a. m., August 22nd, Santa Fe.

Stop at Colorado Springs, one day; Albuquerque, several hours.

Short time at Isleta; one day at Grand Canyon.

Short stop at Redlands, Riverside; one day San Diego, one day at Los Angeles.

Arriving at San Francisco, by Southern Pacific 9:45 a. m. Aug. 29th.

Train Schedule No. 2, Scenic Special.

Leave Chicago 11:00 p. m. August 24th, C. B. & Q. stopping at different points.

Colorado Springs one day, passing thru the Royal Gorge, Tennessee Pass, River Canyon, Salt Lake City, etc. Arriving at San Francisco, 5 p. m., August 29th by Western Pacific.

Train Schedule No. 3.

Leave Chicago 11 p. m. August 25th by C. B. & Q., travel by Denver & Rio Grande and Western Pacific.

Arrive at San Francisco, 5 p. m. August 29th.

Choose your Route and—

Make your railway reservation now to attend the Panama-Pacific Dental Congress, in order to lend your early encouragement to the organization of a party large enough to insure the operation of a special train for the exclusive accommodation of our organization.

Those starting from Boston and New England districts address Mr. C. E. Colony, City Ticket Agent, B. & A. R. R.

Reservations for parties from New York and adjacent districts will be made by W. V. Lifsey, General Eastern Passenger Agent, New York Central Lines, 1216 Broadway, N. Y.

From Chicago, reservations will be made by Mr. A. J. Puhl, General Agent Passenger Dept. Burlington Route, 141 South Clark St., Chicago, Ill.

TRANSPORTATION COMMITTEE
NATIONAL DENTAL ASSOCIATION.

DELTA SIGMA DELTA FRATERNITY

The Thirty-first Annual Meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Auditorium Building, San Francisco, Cal., Wednesday, September 1st, 1915, at 10 a. m.

The regular order of business will be carried out, to be followed by initiatory exercises in the afternoon. The Annual Banquet will be held at the St. Francis Hotel, at 7 o'clock p. m. The headquarters of the Fraternity will be at the Hotel Clift.

BURTON LEE THORPE,
Supreme Grand Master.

R. HAMILL D. SWING,
Supreme Scribe.

MISSOURI'S DELEGATES TO PANAMA-PACIFIC DENTAL CONGRESS.

Jesse Miller, Maryville.
Burton Lee Thorpe, St. Louis.
George E. Haigh, Jefferson City.
D. D. Campbell, Kansas City.
C. O. Simpson, St. Louis.

CALIFORNIA'S DELEGATES TO THE HOUSE OF DELEGATES.

A. M. Flood, San Francisco.
A. W. Ward, San Francisco.
T. Sidney Smith, Palo Alto.
W. J. Burbridge, San Francisco.

REPORT OF DR. JOS. D. EBY.

Member Transportation Committee International Dental Congress and National Dental Association.

Attention Southern Dentists:

THE time is now approaching when all members of the National Dental Association should begin to consider seriously their prospective plans of attending the joint session of the National Dental Association, and International Dental Congress, to be held in San Francisco, at the Panama-Pacific Exposition, Aug. 30th to Sept. 9th.

This is the opportunity of a life time to combine business and pleasure in a Western trip.

The wide range for the selection of literary and Clinical material, also exhibits, have placed the International Dental Congress meetings of the past among the greatest in dental history. The organization of this Congress has been at work more than two years, and it is safe to predict that this Congress will eclipse all other similar meetings of the past.

This is an era when great knowledge can be received from this meeting, to the extent that its value should be placed at the highest mark, and the expense and time necessary to attend should bring great inspiration to our profession, as well as immediate practical returns.

Ostensibly, the grandeur of our Western scenery, and the delightful climate of the season should determine the fact that "This is my year to take a trip West."

The question if itinerary is governed almost entirely by the time one wishes to spend. Stopovers and varied routings can be arranged with practically no additional transportation expense, excepting over the Northern Lines.

As a member of the Transportation Committee of the National Dental Association, also same committee, Panama-Pacific Dental Congress from the territory including North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama and Mississippi, much time has been spent in considering the numerous routes, etc., with a view toward being able to make the very best recommendations to members from this territory.

I beg to advise, after careful consideration, I have decided the most practical, attractive, and best way for the Dentists in the Southeast who expect to attend this meeting, will be to make New Orleans a concentrating point, and have therefore arranged with the Southern Pacific Railroad to operate special private Pullman sleeping cars, form New Orleans thru to Los Angeles, on the following schedule:

Lv. New Orleans	11:30 P. M.	August 19th, Southern Pacific Train No. 9.
Ar. Houston	11:30 A. M.	August 20th, Southern Pacific Train No. 9.
Lv. Houston	11:50 A. M.	August 20th, Southern Pacific Train No. 9.
Ar. San Antonio	7:20 P. M.	August 20th, Southern Pacific Train No. 9.
Lv. San Antonio	8:50 P. M.	August 20th, Southern Pacific Train No. 9.
Ar. El Paso	6:30 P. M.	August 21st, Southern Pacific Train No. 9.
Lv. El Paso	6:00 P. M.	August 22nd, Southern Pacific Train No. 9.

Ar. Los Angeles	9:20 P. M. August 23rd, Southern Pacific Train No. 9.
Lv. Los Angeles	7:25 A. M. August 28th, Southern Pacific Train No. 21.
Ar. San Francisco	10:55 P. M. August 28th, Southern Pacific Train No. 21.

One hour, five minutes stopover at SanAntonio.
Twenty-five hours, 50 minutes stop over at El Paso.
Four days stopover at Los Angeles.

You will note this schedule shows our arrival at El Paso 6:30 P. M., 21st, leaving 6:00 P. M. 22nd, or stopover at that point of approximately 24 hours. Delegates can spend night on car, using berths, instead of Hotels. This arranged on account of invitation extended by the El Paso Chamber of Commerce offering us an excellent free trip in and around the City of El Paso, together with side trip over the Borderline to the City of Juarez, Mexico, which I am sure will prove very enjoyable. Also, please note that stopover is made at Los Angeles of four days, which is arranged for sight seeing in and around that City, together with plenty of time to make side trip to San Diego, to see the Exposition at that point, without additional transportation expense.

On arrival in Los Angeles, the private Pullman cars will be dispensed with, and from there to San Francisco, Pullman Parlor Observation cars will be used, and the schedule as shown is via the Coast line Division of the Southern Pacific Railroad, which takes in all of the world's famous resorts of California. such as Santa Barbara, San Luis Obispo, Paso Robles Hot Springs, Del Monte, Monterey, Santa Cruz, Pacific Grove of Big Trees, San Jose, etc., arriving in San Francisco night of the 28th, thirty-six hours before our meeting convenes.

I will also state that the trains on which these special cars will move carry dining and observation cars, etc.; in fact, all features that go to make up the best there is to be had in train service.

Stopovers at any and all points desired will be allowed by the railroads, going and returning, within final limit of tickets, which will be three months from date of sale.

The New Orleans gateway is by far the most logical and convenient for a concentrating point, of any in the Southeast, and I trust you will give this matter serious consideration, and arrange to join this party so that we can all travel in one body.

On going trip, be sure and have your ticket routed via New Orleans, and Southern Pacific railroad to San Francisco. Returning, would suggest following lines, which can be secured for the same rate, namely, Southern Pacific to Ogden, Denver & Rio Grande to Denver, Union Pacific to Kansas City, Wabash to St Louis, Louisville & Nashville to Nashville, thence any direct line to starting point.

The Southern Pacific line from San Francisco takes in the beautiful part of California known as the Lake Tahoe Region. Side trip can be made from Truckee, a main line point, thru the Lake region, including boat trip of 75 miles around the lakes, for $5 00. Thence, to Ogden, from which point side trip can be made thru the Yellowstone National Park, consisting of round trip railroad fare, four nights lodging, and thirteen meals while in the park, at at rate of $53.50. Thence, return back to Salt Lake, where, after seeing the sights of this wonderful city, the Denver & Rio Grande can be used to Colorado Springs, and at this point, "Manitou," the "Garden of the Gods" and Pike's Peak are to be seen. Thence to Denver, at which point sight seeing in and around the city, visiting the World's Famous Indian Congresses, etc. From Denver, would suggest Union Pacific lines to Kansas

City, Wabash R. R. to St. Louis, L. & N. to Nashville, thence any direct line from that point to original starting point.

The following are the rates applying from some of the most prominent points in the states of the Southeast, for the trip as outlines above; also rate covering trip for those who may desire to take in Portland, Seattle, and North Pacific Coast. Correspondingly low rates are offered by the railroads from all other points in this territory, than those as enumerated.

Rates from	Via Direct Routes	Via North Pacific Coast
Atlanta, Ga.	$71.90	$ 95.00
Macon, Ga.	72.00	96.85
Augusta, Ga.	78.25	101.60
Savannah, Ga.	80.50	104.50
Chattanooga, Tenn.	66.95	88.40
Knoxville, Tenn.	72.55	91.00
Nashville, Tenn.	63.50	85.25
Memphis, Tenn.	57.50	81 20
Asheville, N. C.	79.05	97.50
Charlotte, N. C.	84.15	102.32
Raleigh, N. C.	87.95	106.12
Winston-Salem, N. C.	84.15	102.32
Spartanburg, S. C.	81.50	101.00
Charleston, S. C.	85.15	106.85
Columbia, S. C.	82.45	104.24
Greenville, S. C.	80.00	101.00
Birmingham, Ala.	63.50	88.40
Montgomery, Ala.	63.50	88.40
Mobile, Ala.	63.50	88.40
Jacksonville, Fla.	80.50	104.50
Tampa, Fla.	89.00	113.00
Palatka, Fla.	82.70	106.70
Columbus, Miss.	58.30	84.55
Greenwood, Miss.	57.50	83.75
Meridian, Miss.	57.50	83.75
Hattiesburg, Miss.	57.50	83.75

Approximate charges for lower berth in Pullman sleeping car to make direct round trip as outlined above, including stopovers at prominent points, from New Orleans, would be $32.00. The North Pacific Coast Tour, via Portland, etc., would be approximately $42.00.

It will be my pleasure to see that you are furnished with any other detailed information you may desire in regard to rates, tickets, limits, stopovers, side trips, etc., and you can either address letter to myself, or to Mr. D. L. Griffin, agent, Southern Pacific Company, Atlanta., Ga., and such information as you desire will be furnished you promptly, together with literature pertaining to California, the expositions, and Dental Congress. Either of us will make sleeping car reservations for you on receipt of advice as to what is wanted in this respect.

Please let us hear from you, and oblige,

Yours truly,

NAT'L TRANSPORTATION COMMISSIONER.

Remember

THE PANAMA-PACIFIC DENTAL CONGRESS

Meets August 30th to September 9th

Have you made your Transportation and Hotel Reservations?

LIQUID KOLYNOS

"THAT'S A COMFORT"

Your thoughtfulness in spraying the mouth and throat of your patient with the New Liquid Kolynos before and after operating, will be doubly appreciated during the humid days of July and August when the rubber dam and dental napkins seem so oppressive.

The cool, refreshing vapor of the New Liquid Kolynos relieves the parched throat and removes the sense of suffocation caused by the dam and accomplishes a high degree of agreeable disinfection.

Samples of Liquid Kolynos and Kolynos Dental Cream sent upon request.

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